

# Bulletin of the Chicago Academy of Sciences

## A MONOGRAPH OF THE GENUS *BELOSTOMA* (HEMIPTERA)

PART III. **B.** TRIANGULUM, BERGI, MINOR, BIFOVEOLATUM  
AND FLUMINEUM GROUPS

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A MONOGRAPH OF THE GENUS *BELOSTOMA*  
(HEMIPTERA)

**PART III. *B. TRIANGULUM, BERGI, MINOR,*  
*BIFOVEOLATUM AND FLUMINEUM GROUPS***

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These five species groups contain the so called medium sized *Belostoma*. The *minor* and *flumineum* groups include our common North American species and thus this part will be most valuable to those interested in our local fauna. For keys to the species groups, Part I (Bulletin Chicago Academy of Sciences, vol. 11, No. 3, page 46) should be consulted, although members of the *minor* and *flumineum* groups are easily separated from one another by the characters contained herein.

***Belostoma triangulum* group**

Medium-sized, flat, greatly dilated species, ranging from 19.5 to 23.0 mm. long.

Interocular space wide, approaching two times the width of an eye; clypeus slightly short of, or extending to, the ocular line; eyes rounded, nearly semicircular, mesal margins nearly parallel; segment I of beak equal to, or slightly shorter than, segment II. Prosternal keel triangular, apex pointed, the caudal margin somewhat convex; scutellum not reaching the nodal line. Pilosity of connexivum covering one-third to a fourth of the margin, greatly constricted between spiracles, extending only slightly beyond penultimate segment.

This group contains three species which may be separated by the following key:

Key to the species of the *triangulum* group

1. Segment I of beak about equal to II; anteculus and interoculus subequal *B. triangulum* n. sp. Segment I of beak distinctly shorter than II; anteculus longer than interoculus 2.
  2. Head with prominent foveae mesad of anterolateral margins of eyes; embolium covered with relatively long hairs  
----- *B. bicavum* n. sp.

Vol. 11, No. 5 December 31, 1964  
Head without prominent foveae ; embolium with only a few scattered hairs*B. parvoculum* n. sp.***Belostoma bicavum* n. sp.**

Figures 75, 80

*Size and shape.* Body ovoid. Length : ♂', 19.5-20.5 mm. ; ♀♀, 19.0-20.0 mm. Width : ♂', 10.0-11.0 mm. ; ♀♀, 9.810.4 mm. Width of head, 3.9-4.2 mm. ; width of pronotum, 6.0-6.3 mm. ; length of pronotum, 3.7-3.9 mm.

*Color and markings.* Brown with yellow mottling. Scutellum dark mahogany-brown, often with an irregular yellow spot ; thoracic venter brownish-black. Lateral margins of hemelytra with contrasting dark brown and yellow mottling. Each femur with three irregular bands, often merging and distinctly wider than the intervening light areas ; protibia with three dark bands, first band splitting into two partial bands ; mesotibia with three, often obscure bands, metatibia dark ; tarsi dark. Abdominal venter yellowish-brown ; each segmental margin of connexivum with two transverse stripes converging abruptly into a large caudal spot.

*Structural characteristics.* Interocular space 1.9 to 2.0 times the width of an eye ; anteoculus about one-and-a-fourth longer than interoculus ; clypeus not reaching the ocular line ; eye slightly wider than long with a prominent hollowed fovea mesad of each anterolateral margin of the eyes ; segment I of beak shorter than II. Prosternal keel triangular, acutely pointed ; embolium covered with long silky hairs. Entire dorsal surface of females covered with long hairs. Genitalia as shown in figures 75 and 80.

*Comparative notes.* *B. bicavum* differs from the other members of this group by the prominent foveae of the head.

*Types.* Holotype (s), allotype (9), and 4 ♂♂ cr and 2 ♀♀ paratypes from "Rio Purus, Lago Berury Region, Brasil" (KU). The holotype measures 20 mm. long and 10.5 mm. wide, while the allotype is 19.5 mm. long and 9.8 mm. wide.

*Etymology.* *B. bicavum* derives its name from the prominent foveae of the head.

*Distribution.* Known only from the type series.

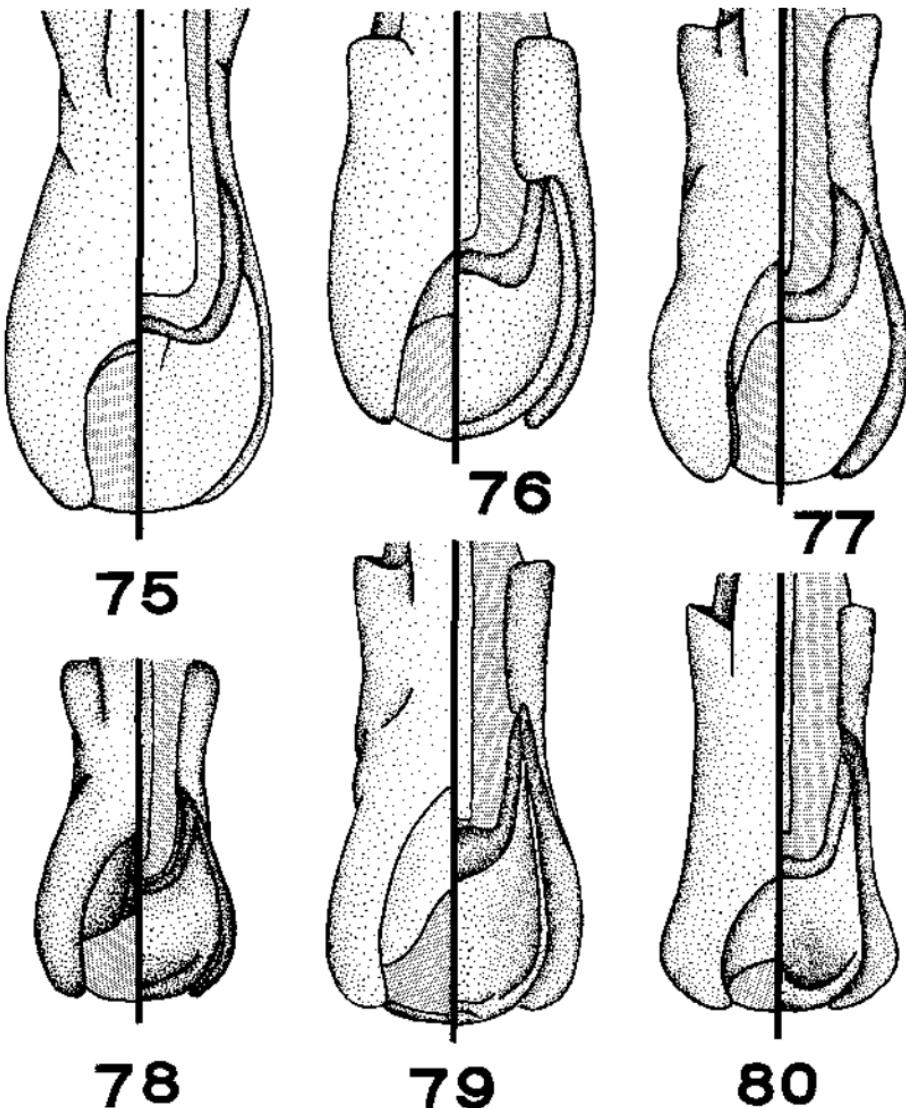
***Belostoma parvoculum* n. sp.**

Figures 76, 82

*Size and shape.* Body ovoid, moderately dilated. Length,

19.0 mm. ; width, 9.7 mm. ; width of head, 3.8 mm. ; width of pronotum, 5.9 mm. ; length of pronotum, 2.7 mm.

*Color and markings.* Dorsal surface uniformly light brown. Thoracic and abdominal venter mottled yellow and brown ; connexival margin with three dark stripes merging



Figures 75 through 80

Dorsal and ventral aspect of genitalia. 75, *B. bicavum*; 76, *B. parvoculum*; 77, *B. triangulum*; 78, *B. bosqi*; 79, *B. bergi*; 80, *B. martinezii*.

into a solid dark patch on each segmental margin. Profemur with irregular dark banding, each meso- and metafemur with two irregular H-shaped bands about the same width as the intervening light areas ; protibia with three dark bands, each meso- and metatibia dark ; protarsi light yellow, meso- and metatarsi missing.

*Structural characteristics.* Interocular space 2.0 times the width of an eye ; anteoculus about one-fourth longer than the interoculus ; eyes small, about as long as wide ; clypeus not reaching the ocular line ; foveae of head shallow ; segment I of beak shorter than II. Prosternal keel triangular, sharply pointed ; hemelytra without long silky hairs. Genitalia as shown in figures 76 and 82.

*Comparative notes.* *B. parvoculum* differs from the other species in this group in that it lacks patches of hairs on the hemelytra and in having small eyes.

*Types.* Holotype (d) from "Solimsas River Manacapuru, Amazonas, Brasil" (KU).

*Etymology.* *B. parvoculum* derives its name from the small eyes which characterize this species.

*Distribution.* Known only from the male holotype.

***Belostoma triangulum* n. sp.**

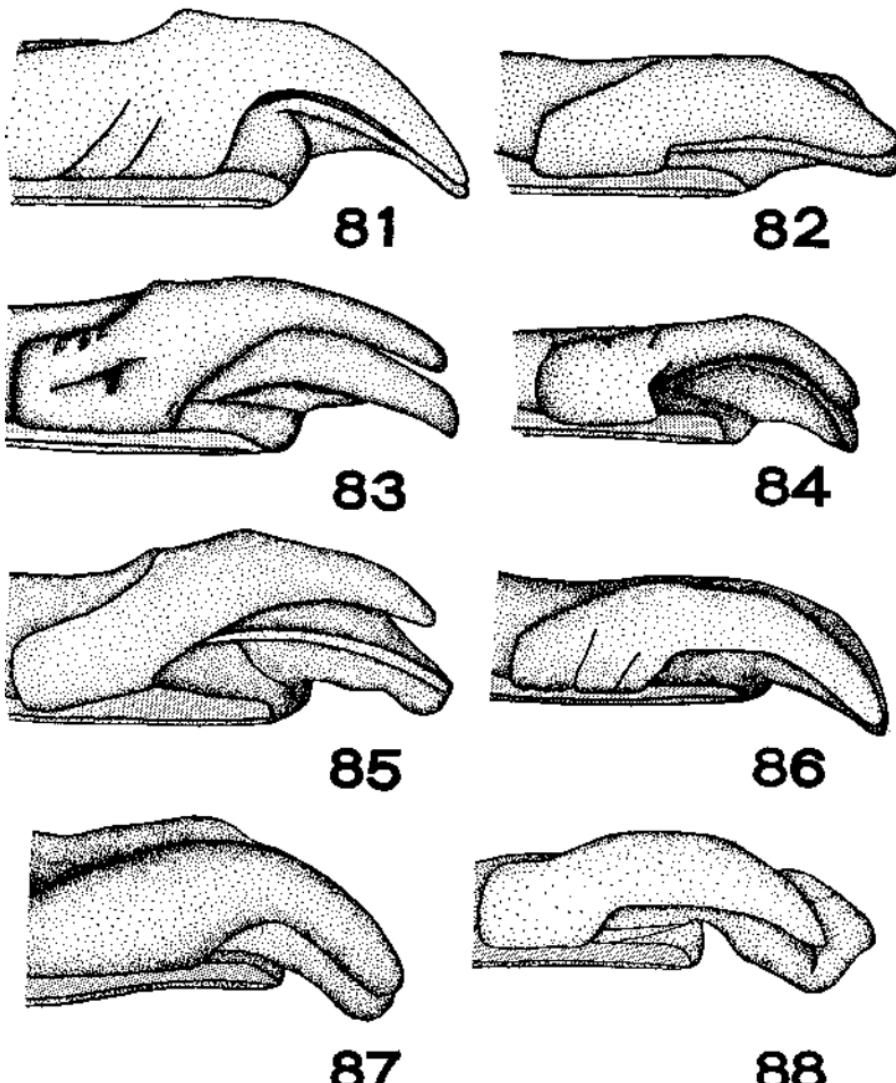
Figures 77, 83

*Size and shape.* Body elliptical, larger specimens becoming distinctly ovoid. Length : e e, 19.5-23.0 mm. ; 9 9, 19.5-22.5 mm. Width : c3` , 10.0-12.0 mm. ; 9 , 10.5-11.5 mm. Width of head, 4.5-5.0 mm. ; width of pronotum, 5.7-6.5 mm. ; length of pronotum, 3.2-3.6 mm.

*Color and markings.* Almost uniformly dark brown. Scutellum dark chocolate-brown, some specimens spotted with yellow ; thoracic venter dark brown. Each femur with three irregular, often H-shaped or sometimes obscure, dark bands, usually narrower than the width of the intervening yellow parts ; protibia with three dark bands, each meso- and meta-femur with three, often obscure dark bands ; tibiae light, tipped with dark band. Abdominal venter dark brown, sometimes tinged with orange ; connexival margin with two irregular dark transverse stripes converging mesally into a single dark spot on each segmental margin.

*Structural characteristics.* Interocular space 1.7 to 1.9

times the width of an eye; anteoculus and interoculus sub-equal; clypeus reaching the ocular line; eyes long as wide; foveae shallow; segment I and II of beak subequal. Prosternal keel triangular to slightly elongate; patch of long hairs along anterolateral margin of clavus next to embolium; short and sparse hairs covering pronotum and rest of hemelytron.



Figures 81 through 88

Lateral aspect of genitalia. 81, *B. bicavum*; 82, *B. parvoculum*; 83, *B. triangulum*; 84, *B. bosqi*; 85, *B. bergi*; 86, *B. martinezi*; 87, *B. costalimai*; 88, *B. confusum*.

Genitalia as shown in figures 77 and 83.

*Comparative notes.* *B. triangulum* n. sp. differs from *B. parvoculum* and *B. bicavum* by the larger eyes and comparatively smaller anteoculus.

*Types.* Holotype (cm allotype ( 9 ) , and 2 cr  $d^t$  and 3 9 9 paratypes from "Leonpampa, Dept. Huanuco, Peru." The holotype measures 21.5 mm. long and 11.8 mm. wide, while the allotype is 21.0 mm. long and 11.0 mm. wide. An additional 3 c3 cr and 2 9 9 , from "Shapajilla, Dept. Huanuco, Peru" are with the above specimens in the Francis Huntington Snow Entomological Collections at the University of Kansas. A single male paratype labelled : "Aucuyacu, Huanuco, Peru," is in the collection of Dr. Carl Drake (USNM) .

*Etymology.* The name of this species is derived from the triangular-shaped prosternal keel.

*Distribution.* This species is known only from the type series from Huánuco, Peru, and a male and female from Caceres, Mato Grosso, Brazil (MC) .

### *Belostoma bergi* group

Medium sized, fiat, elliptical specimens ranging from 20 to 26 mm. long.

Light brown to dark brown, hemelytra frequently variegated with specks of yellow.

Anteoculus subequal to the interoculus ; segment I of the beak distinctly longer than segment II; eye acutely triangular, outer margin nearly straight, length noticeably greater than width, length subequal to anterior width of the interoculus. Lateral margins of pronotum nearly straight ; prosternal keel prominent, apically rounded to obtusely pointed. Male genitalia with nearly globular ventral diverticulum, apex only slightly produced ventrally.

The *bergi* group contains four species from South America which may be identified by the following key :

#### Key to the species of the *bergi* group

1. Pilosity completely covering the connexivum ..... *B. costalimai* DeCarlo.
2. Pilosity not completely covering the connexivum ..... 2.
2. Lateral margins of body greatly dilated and angulate ;

dorsal	arms	of	phallobase	abruptly	expanded	(fig.	80)
.....	.....	.....	.....	.....	.....	.....	.....
Lateral margins of body elliptical ; arms of phallobase not							
abruptly expanded	-----	-----	-----	-----	-----	-----	3.
3. Interoculus with median longitudinal carina							
-----	-----	-----	-----	-----	-----	-----	<i>B. bosqi</i> DeCarlo.
Interoculus without a median carina							
-----	-----	-----	-----	-----	-----	-----	<i>B. bergi</i> (Montandon).

***Belostoma bosqi* DeCarlo**

Figures 78, 84

*Belostoma bergi*, DeCarlo, 1930, Rev. Soc. Ent. Arg., no. 13: 117, pl. 5, fig. 4.

*Belostoma bosqi* DeCarlo, 1932, Rev. Soc. Ent. Arg., 22: 125126, pl. 4, fig. 1.

*Belostoma bosqi*, DeCarlo, 1938, An. Mus. Arg. Cien. Nat., 39: 220, pl. 7, fig. 56.

*Size and shape.* Body comparatively narrow, elliptical. Length : d cr, 20.5-21.5 mm. ; 9 9 , 20.5-22.0 mm. Width : d d , 9.8-10.5 mm. ; 9 , 9.9-10.6 mm. Width of head, 3.6-4.1 mm. ; width of pronotum, 6.5-7.3 mm. ; length of pronotum, 26-33 mm.

*Color and markings.* Light brown, mottled with bright yellow, often appearing shiny. Scutellum mostly uniformly brown with lighter mottling along lateral margins ; thoracic venter with a prominent yellow oblique longitudinal stripe ; hemelytra usually with numerous specks of light yellow. Femora without bands or with a few irregular distal bands, narrower than the intervening light areas ; protibia with three faint dark bands, each meso- and metatibia irregularly mottled ; protarsi brown, mesotarsi light brown tipped with dark, metatarsi dark. Abdominal venter spotted with yellow, each segmental margin of the connexivum with three broad transverse stripes merging medially, light spots appearing as half moons.

*Structural characteristics.* Interoculus 1.5 to 1.6 times the width of an eye ; clypeus almost reaching the ocular line ; foveae of vertex prominent, forming a median carina ; beak moderately long, segment I about one-fourth longer than II. Prosternal keel elongate, prominent and slightly projecting

anteriorly. Embolium of hemelytron smooth or with a few scattered hairs. Pilosity covering about two-thirds the connexivum ; genital operculum coarsely set with moderately long hairs. Genitalia as shown in figures 78 and 84.

*Comparative notes.* *B. bosqi* is similar to *B. bergi*, but differs from this species by the carinate head, lack of dense hairs on embolium, and comparatively narrower body shape. *B. bosqi* is also considerably narrower than *B. costalimai* and *B. martinezii*.

*Types.* *B. bosqi* was based on a holotype and paratype from Gob. del Chaco, Argentina (BA) ; a paratype from Misiones, Argentina (BA) ; a paratype from Paraguay (Museum del la Plate) ; and an allotype and paratype from Gorumbá, Brazil (collection of Pellerano) . In addition to those listed by DeCarlo (1932) are 2 females from Santo Tomé, Corrientes, Argentina (KU), labelled and determined as paratypes by DeCarlo. Only the latter paratypes have been examined.

*Distribution.* *B. bosqi* is known only from a few, widely scattered localities. Specimens from the following localities have been identified :

ARGENTINA. CORRIENTES: Santo Tomé, 2 9 9 (KU). Misiones : d (KU) .

BOLIVIA. SANTA CRUZ: Puerto Suarez, cr (MC) ; Santiago, Chiquitos, e (MC).

BRAZIL. GOIAS : Santa Isabel, Rio Arguaia, 2 <sub>d</sub> e  
(LACM) , Ilha do Bananal, <sup>y</sup> (MC). MATO GROSSO: Caceres,  
e, (MC) ; Corumbá, e, 2 9 9 (MC) ; Jacaré, P. N. Xingu, 11 d e, 7 9  
9 (MC).

DUTCH GUIANA. Moengo, Cottica River, 3 d d (KU) . PARAGUAY. 2 (FU) . CENTRAL: Asunción, 9 (DC). PERU. HUÁNUCO: Huallaga ; Aguaytía, 9 (MC) . VENEZUELA. PORTUGUESA: Guanare, 3 e e, 9 (MC).

### *Belostoma bergi* (Montandon)

Figures 79, 85

*Zaitha bergi* Montandon, 1899, Bull. Mus. Hist. Nat. Paris, 4:172-173.

*Zaitha boops*, Berg, 1879, Hem. Arg., p. 190.

*Belostoma bergi*, Kirkaldy and Bueno, 1909, Proc. Ent. Soc.

Wash., 10: 190.

*Belostoma asiaticum*, DeCarlo, 1930, Rev. Soc. Ent. Arg., no. 13 : 116-117, pl. 5, fig. 5.

*Belostoma bergi*, DeCarlo, 1932, Rev. Soc. Ent. Arg., 22: 124125, pl. 4, fig. 2.

*Belostoma bergi*, DeCarlo, 1938, An. Mus. Arg. Cien. Nat., 39 : 219-220, pl. 7, fig. 55.

*Size and shape.* Body moderately dilated, elliptical. Length : ♂ ♂, 21.0-24.0 mm. ; ♀ ♀, 20.0-23.0 mm. Width : d d, 11.012.7 mm. ; ♀ ♀, 10.5-12.0 mm. Width of head, 3.9-4.6 mm. ; width of pronotum, 6.9-8.1 mm. ; length of pronotum, 3.0-3.5 mm.

*Color and markings.* Uniformly brown to reddish-brown, usually without distinct and prominent markings.

*Structural characteristics.* Interoculus 1.6 to 1.7 times the width of an eye ; clypeus almost reaching the ocular line ; foveae of head shallow, not forming a carina ; beak moderately long, segment I about one-fifth longer than II. Prosternal keel elongate, prominent, slightly projecting anteriorly ; embolium of hemelytron with dense, moderately long hairs. Pilosity covering about three-fourths the connexivum ; genital operculum with closely set, moderately long hairs. Genitalia as shown in figures 79 and 85.

*Comparative notes.* *B. bergi* (Montandon) is very similar to *B. costalimai* in both body shape and size but is easily distinguished from this species by the hairs of the connexivum. Narrow specimens are similar to *B. bosqi* but differ by the color pattern and the hairs of the embolium.

*Types.* Montandon based his description on a series of specimens from Buenos Aires, Argentina, and Rio Grande, Brazil (Paris). Since these specimens were not examined, a male from Anchorua, Buenos Aires, Argentina, was used for the drawings.

*Distribution.* *B. bergi* is known primarily from Argentina and Paraguay. Specimens from the following localities have been identified :

ARGENTINA. 9 (DC), 9 (KU). BUENOS AIRES : (DC) ; Martinez, 6 (MC) ; Olivos, 11 ♂ ♂, 6 9 9 (KU), 9 (MC) ; San Pedro, 6 ♂ ♂ 9 (MC). CHACO : Resistencia, 3

, 9 (FU), a (USNM). CORRIENTES : d' (DC). MEN-

DOZA : Mendoza, 5' (KU). SANTA FE : Santa Fe, d' (DC). PARAGUAY.  
 CENTRAL : Asunción, 5 d' .6 , 5 9 9 (DC), e (KU), d', 9 (MC) , 9 (USNM) .  
 GUIAIRÁ : Villarica, 3  
 d e , 6 y 9 (KU). PARAGUARI : Sapucay, d' , 9 (USNM). PERU. JUNIN  
 : Satipo, 4 d d' , 7 9 9 (DC), d (MC) . URUGUAY. MONTEVIDEO : a (MC) .

***Belostoma martinezii* DeCarlo**

Figures 80, 86

*Belostoma martinezii* DeCarlo, 1957, Rev. Soc. Ent. Arg., 19: 53-54.

*Size and shape.* Body broadly dilated, lateral margins angulate, giving the specimens a diamond-shape. Length :

e a , 21.5-22.0 mm. ; 9 9 , 21.0-23.5 mm. Width : <sub>d</sub> cr , 12.012.5 mm. ; 9 9 , 11.5-13.0 mm. Width of head, 4.1-4.5 mm. ; width of pronotum, 6.5-7.5 mm. ; length of pronotum, 2.83.2 mm.

*Color and markings.* Light brown, intricately mottled with yellow or light orange. Scutellum and thoracic venter mottled ; hemelytra brown to yellowish-gray with darker veins. Each femur with three bands, bands of the meso- and metafemur wider than the intervening light areas ; protibia with three dark bands, each meso- and metatibia with three indistinct bands or without annulation, tarsi with a single proximal light and distal band. Abdominal venter mahogany-brown, sometimes spotted with yellow ; connexival segments dark brown, with two yellow dashes on each segmental margin.

*Structural characteristics.* Interoculus 1.3 to 1.6 times the width of an eye ; clypeus not reaching the ocular line ; foveae of head prominent, forming a median carina ; beak long, segment I about one-fifth longer than II. Prosternal keel elongate, conspicuous, slightly projecting anteriorly. Pilosity covering about two-thirds the connexivum ; genital operculum coarsely set with moderately long hairs. Genitalia as shown in figures 80 and 86.

*Comparative notes.* *B. martinezii* is easily distinguished from the other members of this group by the long beak, dilated diamond-shaped body form, and the arms of the phallobase.

*Types.* Described from a single specimen, the holotype,

from Nueva Moka, Santa Cruz, Bolivia, in the collection of Antonio Martinez.

*Distribution.* The only specimens known, other than the type, are 5 ♂♂ and 12 ♀♀ from Rio Purus, La Berry Region, Brazil (KU), and a single male from Chaparé District, Upper Rio Chipiriri, Bolivia (BM).

***Belostoma costalimai* DeCarlo**

Figures 87, 89

*Belostoma costalimai* DeCarlo, 1938, An. Mus. Arg. Cien. Nat., 39: 234-235, pl. 6, fig. 72.

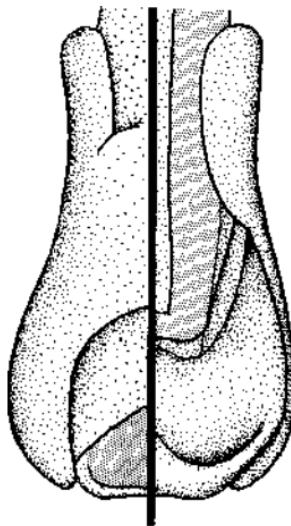
*Belostoma costalimai*, DeCarlo, 1938, Rev. Soc. Ent. Arg., 10: 45, pl. 5, fig. 10.

*Belostoma costalimai*, DeCarlo, 1950, Rev. Brasil Biol., 10: 532.

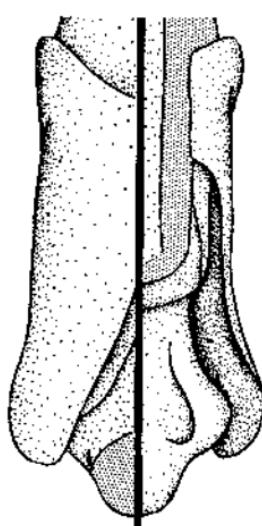
*Size and shape.* Body dilated, elliptical. Length : ♂♂, 23.0-26.5 mm. ; ♀♀, 22.0-25.5 mm. Width : ♂♂, 11.9-13.4 mm. ; ♀♀, 11.1-13.0 mm. Width of head, 4.2-4.7 mm. ; width of pronotum, 7.2-8.6 mm. ; length of pronotum, 3.2-3.3 mm.

*Color and markings.* Brown to olive green, slightly mottled with light yellow to orange. Scutellum with anterior half dark and caudal half light ; thoracic venter uniformly dark mahogany to light brown, mottled with yellow ; hemelytra almost uniformly light brown. Profemur with three, irregular, indistinct bands, mesofemur with three to four bands which may be wider or narrower than the intervening yellow areas, metafemur similar to mesofemur ; protibia with three dark regular bands, meso- and metatibiae dark. Abdominal venter obscured by hairs, usually appearing uniformly mahogany to light brown ; each segmental margin of connexivum with three broad transverse stripes merging medially, light spots appearing as two half moons.

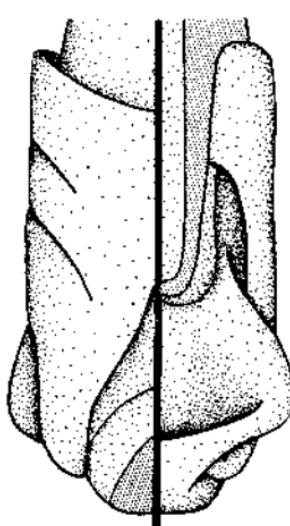
*Structural characteristics.* Interocular space 1.3 to 1.5 times the width of an eye ; clypeus reaching the ocular line ; foveae of head relatively prominent, without median carina, beak moderately long, segment I about one-fourth longer than II. Prosternal keel preminent, elongate and bluntly pointed, not projecting anteriorly. Pilosity completely covering connexivum and sometimes part of sternum ; genital operculum with only a few scattered short hairs. Genitalia as shown in figures 87 and 89.



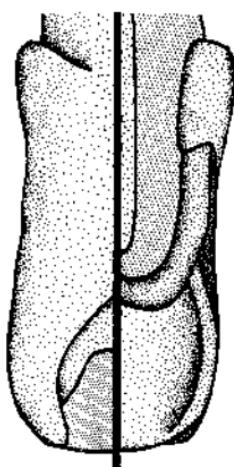
89



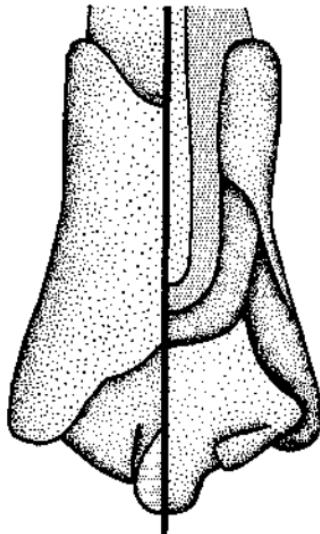
90



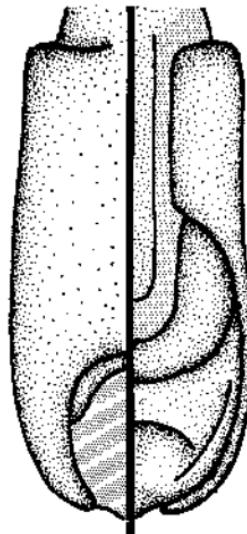
91



92



93



94

Figures 89 through 94

Dorsal and ventral aspect of genitalia. 89, *B. costalimai*; 90, *B. confusum*; 91, *B. thomasi*; 92, *B. minor*; 93, *B. testaceum*; 94, *B. elegans*.

*Comparative notes.* This species differs from the other members of this group by the pilosity of the connexivum and sternum.

*Types.* Described from the holotype and allotype from Rio de Janeiro, São Paulo, Brazil (BA) ; a paratype (Institution of Oswald Cruz) and a paratype (collection of Dr. Aleixo de Vanconeclos) from the same locality. Since the types were not examined, a male from São Paulo, Brazil (KU) , was used for the drawings.

*Distribution.* Specimens from the following localities have been identified :

BRAZIL. GOIÁS : Peixe, 2 (LACM) Santa Isabel do Morro, Ilha do Bananal, 9 (MC) ; Formoso, e (LACM) ; São João da Aliança, 15 e e , 9 9 9 (LACM) . MATO GROSSO : Jacaré, P. N. Xingu, 3 e e , 4 9 9 (MC) . São PAULO : São Carlos, 2 d d (KU) .

#### *Belostoma minor* group

Medium sized, elongate to ovate species ranging from 15.5 to 21.5 mm. long.

Anteoculus distinctly less than interoculus ; interocular space approximately equal to the width of an eye ; clypeus extending beyond the ocular line ; segment I of the beak slightly shorter than II. Abdominal pilosity covering about half to two-thirds the connexivum, extending only slightly beyond the penultimate segment (except in *B. minor*).

This group differs from the *B. flumineum* group by the abdominal pilosity, which does not completely cover the connexivum. Aside from a few members of the *B. subspinosum* group, which are much larger in size, these are the only two groups that extend north of Mexico and in the Antilles.

#### Key to the species in the *minor* group

1. Occurring in eastern U.S. and extending westward along the gulf to Texas ; body ovate, width more than half the length - - *B. tectaceum* (Leidy) . Distribution more southward or westward ; body more elongate, width half or less the length - - - 2.
2. Occurring in the Greater Antilles ; hairs of connexivum bordering genital operculum - - - - - *B. minor* (Palisot de Beauvois) .  
Occurring in southern U.S., Mexico, and Central America ;

hairs of the connexivum not bordering genital operculum

3.

3. Foveae of head forming distinct lateral depressions near cephalomesal margins of the eyes ; connexival margin marked with transverse stripes *B. thomasi* Lauck.  
 Foveae of head not distinct; connexival margins con-  
 colorous ..... *B. confusum* Lauck.

**Belostoma confusum Lauck**

Figures 88, 90

*Zaitha minor*, Mayr, 1871, Verh. zool.-bot. Ges. Wien, 21: 417. (in part—Mexican record).

*Zaitha minor*, Walker, 1873, Cat. Hem. Het. Brit. Mus., 8: 179. (in part—Mexican record).

*Zaitha fusciventris*, Uhler, 1875, U. S. Army Eng. Dept. Rept., Geog. Geol. Expl. Surv. W. 100th Mer., 5: 840. (possibly in part).

*Zaitha fusciventris*, Uhler, 1876, Bull. U. S. Geol. Geog. Survey Terr. 1(5), 2nd series : 338 — p. 72 of reprint — (possibly).

*Zaitha minor*, Uhler, 1886, Checkl. Hem. Het. N. Amer., p. 28 (at least in part).

*Zaitha minor*, Champion, 1901, Biol. Centr. Amer., Hem. Het., 2 : 366, pl. 21, figs. 24, 24a. (at least in part).

*Belostoma apache* Kirkaldy and Bueno, 1909, Proc. Ent. Soc.

Wash., 10 : 190. (in part—Mexican record).

*Belostoma minor*, Banks, 1910, Cat. Nearc. Hem. Het., p. 9. (questionable).

*Belostoma apache*, Van Duzee, 1916, Checkl. Hem. Amer., p. 53. (at least in part).

*Belostoma apache*, Van Duzee, 1917, Univ. Calif. Pub. Ent., 2 : 469. (at least in part).

*Belostoma fusciventre*, DeCarlo, 1938, An. Mus. Arg. Cien. Nat., 39 : 222-223, pl. 7, fig. 59. (in part—Zinacantepec specimen).

*Belostoma apache*, DeCarlo, 1938, An. Mus. Arg. Cien. Nat., 39 : 223-224, pl. 7, fig. 59. (in part).

*Belostoma apache*, Menke, 1958, Bull. So. Calif. Acad. Sci., 57 : 173. (questions the occurrence of *B. apache* in Mexico and U. S.).

*Belostoma apache*, Usinger, 1956, Aquatic Insect Calif., p. 206.

*Belostoma confusum* Lauck, 1959, Bull. Chicago Acad. Sci., 11: 4-5, figs. 1, 4. (in part).

*Size and shape.* Body elongate-ovoid. Length :  $d$  6, 16.520.0 mm. ; 9 9, 16.0-21.5 mm. Width :  $d' cr$ , 7.6-8.8 mm. ; 9 9, 7.6-10.0 mm. Width of head, 3.8-4.4 mm. ; width of pronotum, 5.8-7.5 mm. ; length of pronotum, 2.7-3.5 mm.

*Color and markings.* Dull brown to light cream. Thoracic venter light brown to yellow ; hemelytra grayish-brown to cream. Legs indistinctly and irregularly banded, except for three regular bands on the protibia. Abdominal venter dark grayish-brown to light yellow, connexival margins without transverse stripes.

*Structural characteristics.* Interocular space 1.4 to 1.5 times the width of an eye ; eyes slightly flattened along the lateral margins, mesal margins nearly parallel ; foveae of vertex not prominent. Apex of scutellum reaching the nodal line. Genitalia as shown in figures 88 and 90.

*Comparative notes.* *B. confusum* differs from the other members of this group by the genitalia, parallel margins of the eyes, and the shallow foveae of the vertex. The size is generally slightly smaller than *B. thomasi*.

*Nomenclature.* Mayr (1871) considered *B. confusum* synonymous with *B. minor* (Dufour). Kirkaldy (1909) renamed *B. minor* (Dufour) — in Kirkaldy and Bueno, 1909 — calling it *Belostoma apache*, believing it to be different from *B. minor* (Palisot de Beauvois). However, *B. minor* (Dufour) is a Brazilian species, not Mexican.

*Types.* Holotype (6), allotype (9) and 53 6 6 and 41 9 9 paratypes from "Tlalpan, D. F., Mex." are in the Francis Huntington Snow Entomological Collections, University of Kansas.

*Distribution.* The range of this species is limited to the southwestern United States and Mexico. Specimens from the following localities have been identified :

UNITED STATES. CALIFORNIA : The record reported by Lauck (1959) from Inyo Co., Little Lake, was in error. This was a specimen of *B. bakeri* Montandon with connexival pubescence missing. This species has not been reported from

1964 Lauck: *Monograph of the Genus Belostoma* 18  
 California. TEXAS: *Cameron Co.*, Brownsville, 9 (KU); *Colorado Co.*, 2 dy (KU); *Kleberg Co.*, Kingsville, 2 d (KU).

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MEXICO. 2'9

(MS), 3 ee, 9 (KU), e (USNM).

DISTRITO FEDERAL: 2 9 (USNM); Canales de Xochimilco, 2? y (KU); d (USNM); Guadalupe, 6 cr, 10 49 9 (AMNH); Lake Texcoco, 8 d d, 14 9 9 (KU); Mexico City, 7 9 '9 (KU); Tlálepam, 10 9 9 (KU); also type series.

CHIHUAHUA: (MC). CHIAPAS: Hidalgo La Libertad, 9 (KU).

JALISCO: Guadalajara, 2 9 9 (L); Union de Tula, d" (KU). MICHOACAN: Carapa, or (KU); Cojumatlán, y (L); Quiroga, 9 (L); Pátzcuaro, 9 (KU); Tuxpan, 6, 2 9 9 (KU); Zacapu, d, 3 9 9 (KU); Zamora, 9 (L); Zitácuaro, 2 y (L).

NUEVO LEON: La Gloria, 2 d d (L).

OAXACA: Oaxaca, 6 c3', 5 9 (KU); Posita, 5 d, 7 9 9 (KU); Tlacolula, 9 (L).

PUEBLA: Puebla, 9 (KU).

QUERETARO: Santa Rosa, cP (L).

QUERETARO-GUANAJUATO: , 9 (L).

YUCATAN: Chichén Itzá, Xtolok Cenote, a (KU).

***Belostoma thomasi* Lauck**

Figures 91, 95

*Zaitha fusciventris*, Dufour, 1863, Ann. Soc. Ent. France, (4) 3: 389. (questionable).

*Zaitha fusciventris*, Mayr, 1871, Verh. zool.-bot. Ges. Wien, 21: 417. (questionable).

*Zaitha fusciventris*, Walker, 1873, Cat. Hem. Het. Brit. Mus., 8: 179. (questionable).

*Zaitha fusciventris*, Uhler, 1875, U. S. Army Eng. Dept. Rept., Geog. Geol. Expl. Surv.

W. 100th Mer., 5: 840. (probably in part).

*Zaitha fusciventris*, Uhler, 1876, Bull. U. S. Geol. Geog. Survey Terr. 1 (5), 2nd series: 388—p. 72 of reprint—(probably only in part).

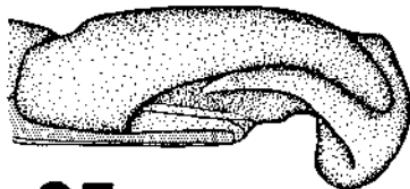
*Zaitha fusciventris*, Uhler, 1886, Checkl. Hem. Het. N. Amer., p. 28, (probably in part).

*Zaitha fusciventris*, Uhler, 1894, Proc. Calif. Acad. Sci., (2)4: 291. (questionable).

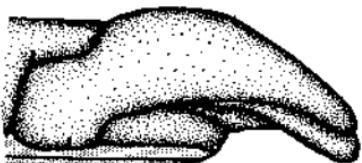
*Zaitha fusciventris*, Champion, 1901, Biol. Centr. Amer., Hem. Het. 2: 366.

*Zaitha fusciventris*, Barber, 1906, Mus. Brooklyn Inst. Arts Sci. Bull., 1: 288. (questionable).

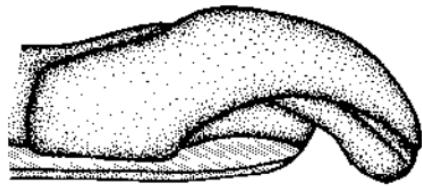
*Zaittha fusciventris*, Banks, 1910, Cat. Nearc. Hem. Het., p. 9. (probably in part).



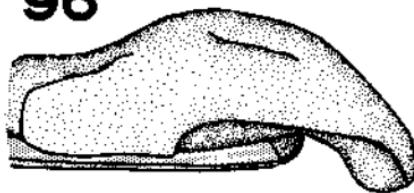
95



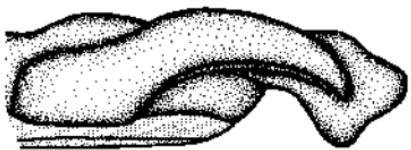
96



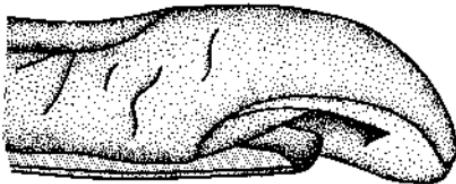
97



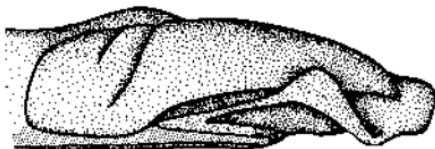
98



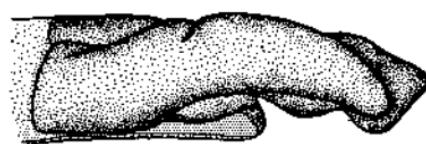
99



100



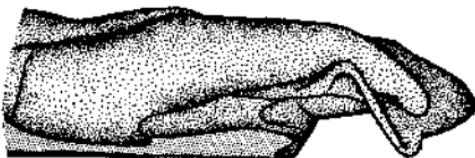
101



102



103



104

Figures 95 through 104

Lateral aspect of genitalia. 95, *B. thomasi*; 96, *B. minor*; 97, *B. testaceum*; 98, *B. elegans*; 99, *B. bifoveolatum*; 100, *B. angustum*; 101, *B. flumineum*; 102, *B. bakeri*; 103, *B. saratogae*; 104, *B. lutarium*.

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Lauck : Monograph of the Genus *Belostoma* 20  
*Belostoma fusciventris*, Bueno, 1906, Ent. News, 18 : 55.*Belostoma fusciventris*, Kirkaldy and Bueno, 1909, Proc. Ent. Soc. Wash., 10 : 191. (at least in part).*Belostoma fusciventris*, Van Duzee, 1916, Checkl. Hem. Amer., p. 53. (at least in part).*Belostoma fusciventris*, Van Duzee, 1917, Univ. Calif. Pub. Ent., 2 : 468-469. (at least in part).*Belostoma fusciventre*, DeCarlo, 1938, An. Mus. Arg. Cien. Nat., 39 : 222-223. (in part—not Zinacantepec record or figure).*Belostoma fusciventris*, Millspaugh, 1939, Field Lab., 7 (2) : 82.*Belostoma fusciventre*, Usinger, 1956, Aquatic Insects Calif., p. 206.*Belostoma fusciventre*, Menke, 1958, Bull. So. Calif. Acad. Sci., 57 : 165-166, fig. 5.*Belostoma thomasi* Lauck, 1959, Bull. Chicago Acad. Sci., 11 : 2-4, 9, figs. 2, 5.

*Size and shape.* Body elongate-ovate. Length : , 16.5-20.0 mm. ; 9 , 18.5-20.5 mm. Width : , 7.7-9.1 mm. ; 9 , 8.7-10.0 mm. Width of head, 3.9-4.6 mm. ; width of pronotum, 5.9-7.7 mm. ; length of pronotum, 2.8-3.6 mm.

*Color and markings.* Mottled with yellow and brown, giving a speckled effect ; some dark specimens without mottling. Thoracic venter usually darker brown. Hemelytra grayish-yellow, mottled with brown. Coxae spotted with yellow ; each femur and tibia with three, usually distinct, dark bands. Abdominal venter usually brown to dark gray, streaked with yellow ; margin of each connexival segment with a single transverse dark stripe.

*Structural characteristics.* Interocular space nearly twice the width of an eye ; eyes slightly flattened along the lateral margins ; mesal margins divergent ; foveae of head prominent, forming deep depressions at the cephalomesal margins of the eyes. Genitalia as shown in figures 91 and 95.

*Comparative notes.* *B. thomasi* is easily distinguished from other members of this group by the depressions of the vertex. It also differs from *B. confusum* by the transverse markings of the connexival margins and the wider interocular space.

*Special variations.* The specimens listed for San Jose and

Cartago Providences, Costa Rica, are distinct from the other specimens of *B. thomasi*. These specimens have a narrower pronotum and head in comparison to the hemelytral width. Also the specimens are more dorsoventrally flattened and the foveae of the head are not quite as prominent. However the genitalia are identical with other specimens of *B. thomasi* and these differences are no greater than those of *B. flumineum* or *B. lutarium* of North America.

*Nomenclature.* *B. thomasi* has been recognized by several authors under the name *Belostoma fusciventre*. *B. fusciventre* first appeared in the literature as a species of Stål. (Dufour, 1863). If SW described this species, I have been unable to find the original description. Dufour may have had either *B. thomasi* or *B. confusum*.

*Types.* Holotype (d'), allotype ( ), and 30 d cr and 33 9 9 paratypes from Cuernavaca, Morelos, México (KU). An additional 13 d' e and 19 9 9 paratypes from Cojutepeque, Cuscatlán, El Salvador, have been placed in several museums and my collection.

*Distribution.* *B. thomasi*, as *B. confusum*, ranges in southwestern United States and Mexico, but also extends southward into Central America. Specimens from the following localities have been identified:

UNITED STATES. TEXAS : *Brooks Co.*, d', 3 9 (KU) ; *Cameron Co.*, Brownsville, e (KU), 9 (INMS), 9 (USNM) ; *Colorado Co.*, 9 (KU) ; *Duval Co.*, San Diego, e (CU) ; *Hidalgo Co.*, Edinburgh, o (KU) ; *Progreso*, e (KU) ; *gorda Co.*, Matagorda, e (USNM) ; *Sutton Co.*, 9 (KU) ; *Tarrant Co.*, Ft. Worth, (USNM) ; *Uvalde Co.*, Sabinal, 9 (KU) ; *Victoria Co.*, Victoria, 2 9 (USNM).

MEXICO. BAJA CALIFORNIA : Mexicali, 9 (AMNH) . CAMPECHE : Ciudad del Carmen, 5 a cg', 12 9 9 (KU) ; Palizada, 9 (KU) . CHIAPAS : Comitán, (KU) ; Hidalgo La Libertad, 9 (KU) ; Lake Tepancuapan, o (KU) ; Tuxtla

Gutiérrez, cr, (KU) . COLIMA : Colima, d, 9 (USNM) . DIS-  
TRITO FEDERAL : Mexico City, 2 9 (KU) . GUERRERO : South.  
of México City, 9 (KU) ; ACAPULCO, 9 (KU) ; Cajones-Rin-  
con, cr (KU) ; Iguala, 4 a, 6 9 (KU) ; Rio de las Balsas, 9 (KU) . HIDALGO : El Chico, d' (KU) . JALISCO : Autlán, 9 (KU) ;  
Tecolotlán, d' (KU) ; Unión de Tula, 2 3' d' (KU) .

MICHOACAN: Carapán, (L) ; El Sabino Urupan, *d'*, 2 9 9 (KU). MORELOS: Cuernavaca, 11 *d d*, 16 9 9 (KU) ; also type series; Puente de Ixtla, 4 *d'*, 10 9 (KU). NAYARIT: Ixtlán del Rio, *e* (MC). NUEVO LEON: Montemorelos,

(AMNH) . OAXACA: La Ventera, *e* (ISU) ; Oaxaca, 2 9 (KU) ; Posita, 10 or 30 9 9 (KU) ; Salina Cruz, 9 (AMNH) ; Tepanatepec, cr (ISU) ; Zacatepec, 2 9 9 (ISU). SONORA : Ciudad Obregon, (ISU). TAMAULIPAS: Hacienda La Clementina, 9 (KU) . VERA CRUZ: Vera Cruz, 9 (ISU) ; Playon sur Plantanas Minatitlán, 9 (AMNH). YUCATÁN: Chichén Itzá, 2 9 9 (KU), 2 *d e*, 9 (MU) ; Merida, cr (KU) ; Yunca, (MU).

GUATEMALA. JUTIAPA: Jutiapa, , 9 (L) .

EL SALVADOR. CUSCATLÁN: type series. LA UNION: San Antonio, *d*, 9 (L) ; Santa Rosa, 2 *e d* (L).

NICARAGUA. , 9 (USNM). RIVAS: Belén, *e* (L) ; Peña Blanca, 2 *e* (L).

HONDURAS. GUANIMAS DISTRICT: Tela, 9 (MU). MORAZÁN: Tegucigalpa, 4 *at a*, 2 9 9 (L).

COSTA RICA. CARTAGO: Turrialba, *e*, 3 9 9 (CIS). GUANACASTE: La Cruz, 9 (L). SAN JOSE: San José, 6 *d' e*, 8 9 9 (L) ; Rio Tiribi, 9 (KU).

***Belostoma minor* (Palisot de Beauvois)**

Figures 92, 96

*Nepa minor* Palisot de Beauvois, 1805, Insect. Rec. Afr. et Amer., p. 236, pl. 20., fig. 3.

*Zaitha minor*, Mayr, 1871, Verh. zool.-bot. Ges. Wien, 21: 417. (in part—var. *cubaensis*).

*Belostoma apache*, Kirkaldy and Bueno, 1909, Proc. Ent. Soc. Wash., 10: 192.

*Belostoma cubaensis*, Van Duzee, 1916, Checkl. Hem. Amer., p. 53.

*Belostoma apache*, Van Duzee, 1917, Univ. Calif. Publ. Ent., 2: 469. (in part—var. *cubaensis* but not Calif. record).

*Belostoma minor*, DeCarlo, 1938, An. Mus. Arg. Cien. Nat., 39: 239.

*Belostoma apache*, DeCarlo, 1938, An. Mus. Arg. Cien. Nat., 39: 223-224. (in part—Cuban record).

*Belostoma minor*, Menke, 1958, Bull. So. Calif. Acad. Sci., 57: 173.

*Belostoma minor*, Lauck, 1959, Bull. Chicago Acad. Sci., 11: 19.

Other species referred to as *minor*.

*Zaitha minor*, Dufour, 1863, Ann. Soc. Ent. France, (4) 3: 391. (unknown identity).

*Zaitha minor*, Walker, 1873, Cat. Hem. Het. Brit. Mus., 8: 179. (unknown identity).

*Zaitha minor*, Mayr, 1871, Verh. zool.-bot. Ges. Wien, 21: 417. (*Belostoma confusum* in part).

*Zaitha minor*, Uhler, 1886, Checkl. Hem. Het. N. Amer., p. 28. (*Belostoma confusum* at least in part).

*Zaitha minor*, Champion, 1901, Biol. Centr. Amer., Hem. Het., 2: 366, pl. 21, fig. 24, 24a. (*Belostoma confusum* at least in part).

*Belostoma minor*, Usinger, 1956, Aquatic Insects Calif., p. 206. (unknown identity).

*Size and shape.* Body elongate-ovate. Length : , 18.2-

21.1 mm. ; 9 9, 18.5-21.0 mm. Width : , 8.5-10.3 mm. ; 9 9 , 8.8-10.1 mm.

Width of head, 4.1-4.3 mm. ; width of pronotum, 6.2-6.6 mm. ; length of pronotum, 2.9-3.1 mm.

*Color and markings.* Yellow and brown mottled. Scutellum dark brown ; venter of thorax with dark margins. Hemelytron smoky with grayish-brown patches, veins with alternating yellow and brown dashes. Coxae yellow, speckled with brown ; profemur with three regular dark brown bands ; each remaining femur and tibia with two or three irregular, dark brown bands ; protarsi yellow, mesotarsi yellow with dark apices, metatarsi yellow with apical portions of the last two segments dark. Abdominal venter yellow to orange, usually speckled with brown and with two faint, irregular longitudinal stripes ; each segmental margin of connexivum with a transverse, brown stripe.

*Structural characteristics.* Interocular space 1.7 to 1.8 times the width of an eye ; eyes slightly flattened along the lateral margins, mesal margins nearly parallel ; foveal grooves prominent. Apex of scutellum nearly extending to the nodal line. Abdominal pilosity covering about three-fourths the connexivum, bordering most of the length of the genital operculum. Genitalia as shown in figures 92 and 96.

*Comparative notes.* *B. minor* is the only species of corn-

parable size in the Greater Antilles. This species is easily distinguished from other members of this group by the more extensive coverage of hairs on the connexivum and the shape of the ventral diverticulum of the male genitalia.

*Nomenclature.* The original description of *Belostoma minor* (Palisot de Beauvois), except for locality, could almost fit any species of *Belostoma*. However, at the side of Palisot de Beauvois's figure of *B. minor* is a 20 mm. line, which corresponds to the dimensions of the above description. The size correctly fits this medium-sized *Belostoma* and the only other species recorded from the island of San Domingo, *B. subspinosum* (Palisot de Beauvois), is considerably longer. Since the specimen used for the original description has apparently been lost, the following neotype is proposed.

*Type.* The neotype bears a label with the following inscription : "16-xi-1955 ; Boca Caica, Rep. Dom., col : D. R. Lauck." This specimen is from the same island, San Domingo, as the specimen used for the original description. The neotype is 19.8 mm. long and 8.5 mm. wide.

*Distribution.* *B. minor* is apparently restricted to the islands of the Greater Antilles. Specimens from the following localities have been identified :

CUBA. (USNM) ; HAVANA: Havana, *cr* (MC) ; PINAR DEL RIO: Pinar del Rio, c<sup>2</sup>, 2 (AMNH).

DOMINICAN REPUBLIC. See locality of neotype.

JAMAICA. Snug Harbor, Montego Bay, 9 (USNM).

PUERTO RICO. ARECIBO : Lake Tortuguero ; (USNM) ; Vega Baja, 9 (L). MAYAGUEZ : Laja, 3 e (L) ; 2 9 9 (L). PONCE : Villalba, Lake Guayabal, 7 a 3 9 9 (L). SAN JUAN: San Juan, 4 d', 2 9 9 (L).

#### *Belostoma testaceum* (Leidy)

Figures 94, 97

*Perthostoma testaceum* Leidy, 1847, Jour. Acad. Nat. Sci. Philadelphia, 1: 66. (type for *Perthostoma*).

*Zaitha reticulata* Haldeman, 1855, Explor. Surv. Valley Great Salt Lake, Utah, Append. C., p. 370.

*Zaitha testaceum*, Mayr, 1863, Verh. zool.-bot. Ges. Wien, 13: 354.

*Zaitha reticulata*, Mayr, 1863, Verh. zool.-bot. Ges. Wien, 13: 354.

*Zaitha testacea*, Mayr, 1871, Verh. zool.-bot. Ges. Wien, 21: 417.

*Zaitha testacea*, Walker, 1873, Cat. Hem. Het. Brit. Mus., 8: 179.

*Zaitha testacea*, Uhler, 1886, Checkl. Hem. Het. N. Amer., p.

28.

*Belostoma testaceum*, Bueno, 1905, Jour. N. Y. Ent. Soc., 13 : 44.

*Belostoma testaceum*, Kirkaldy, 1906, Trans. Amer. Ent. Soc., 32 : 151. (cites as type for *Perthostoma*).

*Belostoma testaceum*, Bueno and Brimley, 1907, Ent. News, 18: 435.

*Belostoma testaceum*, Kirkaldy and Bueno, 1909, Proc. Ent. Soc. Wash., 10: 192.

*Zaitha testacea*, Banks, 1910, Cat. Nearct. Hem. Het., p. 10.

*Belostoma testaceum*, Smith, 1910, Ann. Rept. N. J. State Mus., p. 168.

*Belostoma testaceum*, Barber, 1914, Bull. Amer. Mus. Nat. Hist., 33: 498.

*Belostoma testaceum*, Van Duzee, 1916, Checkl. Hem. Het. Amer., p. 53.

*Belostoma testaceum*, Van Duzee, 1917, Univ. Calif. Publ. Ent., 2: 469.

*Belostoma testaceum*, Bueno, 1923, Conn. State Geol. Nat. Hist. Surv. Bull., 34: 399

*Belostoma testaceum*, Blatchley, 1926, Het. E. N. Amer., p. 1048.

*Belostoma testaceum*, Leonard, 1928, Cornell Univ. Agr. Exp. Sta. Bull., Mem., 101: 140.

*Belostoma testaceum*, DeCarlo, 1938, An. Mus. Arg. Cien. Nat., 39 : 240.

*Belostoma testaceum*, Brimley, 1938, Insects N. Carolina, p. 84.

*Belostoma testaceum*, Millspaugh, 1939, Field Lab., 7: 82.

*Belostoma testaceum*, Herring, 1951, Fla. Ent., 34: 21.

*Belostoma testaceum*, Ellis, 1952, Amer. Mid. Nat., 48: 326.

*Belostoma testaceum*, Penn, 1952, Proc. Louisiana Acad. Sci.,

15: 51.

*Belostoma testaceum*, Menke, 1958, Bull. So. Calif. Acad. Sci., 57 : 164-165.

*Belostoma testaceum*, Wilson, 1958, Tulane Studies Zool., 6: 152

*Belostoma testaceum*, Lauck, 1959, Bull. Chicago Acad. Sci., 11:9.

*Belostoma testaceum*, Froschner, 1962, Amer. Mid. Nat., 67 (1): 232.

*Size and shape.* Body distinctly ovate. Length :  $d'$ , 15.520.0 mm. ; 9 9 , 17.0-19.0 mm. Width : e , 8.5-10.7 mm. ; 9 , 8.7-10.6 mm. Width of head, 4.0-4.6 mm. ; width of pronotum, 5.7-7.2 mm. ; length of pronotum, 2.7-3.1 mm.

*Color and markings.* Dorsal surface uniformly dark brown, ventral surface brown and sometimes slightly mottled with yellow. Profemur with three dark spots, each meso- and meta-femur with two, sometimes irregular, dark bands ; protibia with three distinct bands, mesotibia with three irregular, often indistinct, dark bands, metatibia indistinctly marked, dark ; tarsi dark. Each segmental margin of connexivum with a single indistinct transverse, dark stripe.

*Structural characteristics.* Interocular space 1.9 to 2.0 times the width of an eye ; eyes rounded, mesal margins divergent ; foveae of head not prominent. Apex of scutellum nearly touching nodal line. Abdominal pilosity covering about half or more of the connexivum, only slightly constricted between spiracles, extending slightly beyond penultimate abdominal segment. Genitalia as shown in figures 94 and 97.

*Comparative notes.* *B. testaceum* is the only species found in eastern U. S. with a short anteculus, which is shorter than the interoculus. It is distinguished from the other species of this group by the characters given in the key.

*Nomenclature.* Leidy's original description of *Perthostoma testaceum* is vague and somewhat questionable. *B. testaceum* could have been a small specimen of *B. flumineum* Say. However, a neotype has been proposed on the basis of his statements, "Body spatulate-ovate, . . ." and the size, "length eight and a half lines, breadth four and a half lines." The greatest width is more caudad in *B. testaceum* than in *B. flumineum* and does appear spatulate.

*Type.* The specimen used for the original description could not be located and the designation of a neotype bearing the label : "Phila Neck, V :29.98 Pa, Col. by W. J. Gerhard,"

is proposed. The neotype is 20.6 mm. long and 10.4 mm. wide. Pennsylvania is the type locality stated by Leidy and the neotype is the only specimen that I have seen from this state. It is in the Chicago Natural History Museum.

*Distribution.* The range of this species is very similar to that of *B. lutarium* (Stål), except that it does not extend as far inland and is primarily restricted to the Atlantic and Gulf Coast States. Specimens from the following localities have been identified :

ALABAMA : *Mobile Co.*, Mobile, 9 (KU), 2 d a, 9 (CNMH) ; *Montgomery Co.*, Mount Meigs, 2 a, 7 9 9

(KU).

DISTRICT OF COLUMBIA : (USNM) ; Licking Bands, 3 , 2 9 9 (CU), a, 2 9 9 (USNM) ; East Branch, 3 d (USNM).

FLORIDA : *Alachua Co.*, 2 cr cr, (MU), , 3 9 9 (FU) ; *Archer*, 9 (KU) ; *Gainesville*, 2 9 9 (DC), 9 (FU) ; *Hatchet Crk.*, 9 (FU) ; *Hogtown Sink*, 9 (FU) ; *Payn's Prairie*, d (FU) ; *Sugarfoot Hammock*, 3 a , 2 9 9 (FU) ; *Palm Beach Co.*, *Lake Worth*, 2 d' (USNM) ; *Brevard Co.*, *Titusville*, d (AMNH) ; *Charlotte Co.*, 9 (AMNH) ; *Citrus Co.*, *Iverness*, d' (KU) ; *Gadsen Co.*, *Flat Creek*, d, (FU) ; *Hardee Co.*, *Zolfo Springs*, d (KU) ; *Highlands Co.*, *Archbold Biol. Sta.*, 6 d' , 6 9 9 (CU) ; *Lake Placid*, 2 9 9 (DC) ; *Sebring*, 9 (DC) ; *Hillsborough Co.*, *Plant City*, 9 (MU) ; *Tampa*, 9 (KU) ; *Jackson Co.*, 9 (FU) ; *Liberty Co.*, d' (FU) ; *Nassau Co.*, 9 (KU) ; *Polk Co.*, *Bartow*, d' (NC), 9 (FU), *Kissengen Springs*, d' (FU) ; *Ft. Mead*, 3 9 9 (KU) ; *Lakeland*, e, 9 (FU), d' (MC) ; *Pierce*, 4 d' d , 9 (FU), 2 9 9 (MC) ; *Sarasota Co.*, *Englewood*, (CU), *Venice*, 2 d' d' (CU) ; *Volusia Co.*, *Ormond*, d' (USNM).

GEORGIA : *Bibb Co.*, *Macon*, d , 2 9 9 (KU) ; *Charlton Co.*, *Okefenokee Swamp*, 2 o' ., 9 (CU) ; *Decatur Co.*, 2 9 9 (FU) ; *Glynn Co.*, *St. Simons Island*, 9 (USNM) ; *McIntosh Co.*, *Crescent*, (FU).

LOUISIANA : *Caddo Par.*, 9 (KU) ; *Jefferson Par.*, *Harahan*, 2 a a, 9 (CNMH) ; *Plaquemines Par.*, *Port Sulfur*, 9 (USNM) ; *St. Martin Par.*, *Keystone*, d' (USNM) ; *Terre-bonne Par.*, *Houma*, 9 (USNM) ; *Dulac*, 9 (USNM).

MARYLAND: *Anne Arundel Co.*, *Annapolis*, 9 (KU).

MISSISSIPPI : *Adams Co.*, *Natchez*, 9 (USNM) ; *Hancock*

*Co.*, Waveland, 9 (KU) ; *Jackson Co.*, (off the coast of county) Horn Island, cr (USNM).

NEW JERSEY : 9 (ANMH), a (USNM) ; *Burlington Co.*, Riverton, d' (DC).

NEW YORK : d' (USNM) ; *Bronx Co.*, Parkway, d' (USNM).

NORTH CAROLINA : *Carteret Co.*, Beaufort, 2 a a, 9 (KU), 9 (USNM) ; *Wake Co.*, Raleigh, d' (FU), ? (KU), 3 d' d (NC).

PENNSYLVANIA : see type locality.

TEXAS : *Bowie Co.*, a (KU) ; *Galveston Co.*, Galveston, d' (USNM) ; Galveston Island, 3 d' d' (USNM) ; *Harris Co.*, Houston, cr (USNM).

VIRGINIA : *Arlington Co.*, Arlington, c3' (USNM) ; *Chesterfield Co.*, Beach, 3 9 9 (USNM) ; *Norfolk Co.*, Dismal Swamp, 6 d' a', 9 9 9 (USNM).

Additional reliable records of specimens may be found in the articles of Ellis (1952), Herring (1951), Menke (1958), and Penn (1952).

### *Belostoma bifoveolatum* group

Medium-sized, elliptical to ovoid species, ranging from 19 to 26 mm. long.

Anteoculus about as long as, or shorter than interoculus ; clypeus reaching, or nearly reaching, the ocular line ; anteoculus shorter than width of anterior interocular space ; eye moderately rounded, about as long as broad ; beak slender, segment I subequal or slightly shorter than segment II. Pronotal margins prominently concave to nearly straight ; prosternal keel rounded, not prominently projecting. Pilosity completely covering connexival margins and extending along genital operculum ; genitalia as shown in figures 90 through 92.

There are three species in this group. They exhibit a considerable degree of variation and the characters of one nearly intergrade into the other ; thus, they are difficult to differentiate without series of specimens to compare. The three species may be distinguished by the following key :

#### Key to the species of the *bifoveolatum* group

1. Narrow, elongate body; width of scutellum about half as wide as the hemelytra  
2.

Wider, ovoid body ; width of scutellum less than half the hemelytral width..... *B. bifoveolatum* Spinola.

2. Interocular space 1.4 to 1.6 times the width of an eye ; anteoculus usually less than interoculus ; thick bodied

..... *B. angustum* n. sp.

Interocular space 1.2 to 1.3 times the width of an eye ; anteoculus subequal to interoculus ; thin bodied

..... *B. elegans* (Mayr).

***Belostoma elegans* (Mayr)**

Figures 94, 98

*Zaitha elegans* Mayr, 1871, Verh. zool.-bot. Ges. Wien, 21: 415-416.

*Zaitha elegans*, Walker, 1873, Cat. Hem. Het. Brit. Mus., 8: 178.

*Zaitha elegans*, Berg, 1879, Hem. Arg., p. 191.

*Zaitha elegans*, Montandon, 1895, Bol. Mus. Zool. Anat. Comp., Torino, 10: 10.

*Belostoma elegans*, Kirkaldy and Bueno, 1909, Proc. Ent. Soc. Wash., 10: 191.

*Belostoma elegans*, DeCarlo, 1930, Rev. Soc. Ent. Arg., no. 13: 117-118, pl. 5, fig. 6.

*Belostoma elegans*, DeCarlo, 1935, Soc. Arg. Pat. Reg. Norte, Mendoza, 1935 (1-4): 1473.

*Belostoma elegans*, DeCarlo, 1938, An. Mus. Arg. Cien. Nat., 39: 231-232, pl. 7, fig. 70.

*Belostoma elegans*, DeCarlo, 1939, Rev. Soc. Ent. Arg., 10: 231-234, pl. 1, figs. 1-9.

*Size and shape.* Elongate, thin, narrow body with fragile appearance. Length :  $d^t$ , 20.0-22.0 mm. ; , 20.0-23.0 mm. Width, di , 8.5-9.6 mm. ; 9  $9^4$ , 8.8-10.4 mm. Width of head, 3.6-4.4 mm. ; width of pronotum, 5.9-7.4 mm. ; length of pronotum, 2.9-3.7 mm.

*Color and markings.* Light yellowish-brown to greenish-gray. Anterior portion of scutellum usually darker than posterior part ; thoracic venter light yellowish-brown. Legs usually without conspicuous banding, except the three regular bands on the protibia ; femora and mesotibiae sometimes with two or three irregular, obscure dark bands. Abdominal venter light to dark brown ; connexival margin usually brown, sometimes with two faint marginal spots on each segmental margin.

*Structural characteristics.* Interocular space 1.2 to 1.3 times the width of an eye; clypeus usually not quite reaching the ocular line; anteoculus subequal to interoculus. Lateral margins of pronotum distinctly concave; width of scutellum about half the hemelytral width. Pilosity of the connexivum extending along half to three-fourths the margin of the genital operculum. Genitalia as shown in figures 94 and 98.

*Comparative notes.* *B. elegans* is the smallest and narrowest species of this group. It differs from the other members by the characters given in the key.

*Types.* Mayr, although not designating types, based his description on series of specimens from Mendoza and Buenos Aires (MS, MV, HNM) and Uruguay (MS, MV). I have examined three of these specimens from the museum at Stockholm and designated a lectotype, 9 (from Uruguay), and 2 9 9 syntypes. The lectotype is 22.4 mm. long and 10.3 mm. wide. The drawing of the male genitalia was based on a specimen from Chiquitos, Bolivia, (BM).

*Distribution.* *B. elegans* occupies the southern portion of South America, reaching Bolivia and Peru along the western side. Specimens from the following localities have been identified:

ARGENTINA. 3 6 d, 2 9 9 (KU). BUENOS AIRES : Buenos Aires, 4 6 6, 6 9 9 (DC),  $d^i$  (FU), d, 9 (KU), 9 (MS); Alrededores de Quilmes, 6 d d, 4 9 9 (DC), 2 d' 9 (KU); Campana, 2 9 9 (KU); Luján, 6 3' 6, 2 9 9 (DC); Olivos, 19 3', 7 9 9 (KU); Sao Isidro, 9 (KU); Tigre, 4 e e, 2 9 9 (DC). CORDOBA : Rejo, 9 (KU). CORRIENTES : Esquina, 9 (KU). EL CHACÓ: Fontana, 5 d 6, 9 (DC), 2 , 3 9 9 (FU); Resistencia, 2 9 9 (KU). ENTRE RíOS : Concordia, (KU); La Paz, 9 (KU). MENDOZA : Mendoza,  $d^i$  (DC), or (USNM). SANTA FE : Reconquista, 9 (USNM); Esperanza, 3 6 6, 5 9 9 (HNM); Sancti Spiritus, (DC). SANTIAGO DEL ESTERO : Icaño, Rio Saldo, 3 d' 6, 9 (DC), e, 2 9 9 (KU). BOLIVIA. SANTA CRUZ : Chiquitos, Roboré, 2 c3' d, 2 9 9 (KU). BRAZIL. RIO GRANDE DO NORTE : (AMNH). Rio Grande do Sul: 9 (AMNH), 9 (KU), 9 (MS).

PARAGUAY. 2  $d'$ , 3 9 9 (KU) . GUAIRA : Villarrica, 9 (KU) .  
 PERU. JUNIN : Satipo, 3 d, 9 (DC) .

URUGUAY. 9 (FU), 9 (MS), d (USNM) . ARTIGAS : Barra del Yucutujá, 2 d d, 9 (CC) ; Catalan Chico, 9 (CC) . CERRO LARGO: Sierra de Vaz, 2 9 9 (CC) . COLONIA : Artilleros, 07' (CC) . FLORIDA : Casupá, e (CC). LAVALLEJA : Aquas Blancas, 2 9 9 (CC). MONTEVIDEO: Montevideo, 7 e e, 8 9 9 (CC) ; Punta Carrera, 9 (USNM) ; Pocitos, 9 (USNM) . RIVERA : Tranqueras, 2 d d (CC) . TACUAREMBÓ : Tacuarembó, 2 9 9 (CC) .

***Belostoma bifoveolatum Spinola***

Figures 99, 105

*Belostoma bifoveolatum* Spinola, 1852, Gay's Chile, Zool., 7 : 227-232.

*Zaitha bit oveolata*, Dufour, 1863, Ann. Soc. Ent. France, (4)3 : 389.

*Zaitha bifoveolata*, Signoret, 1863, Ann. Soc. Ent. France, (4) 3 : 581.

*Zaitha bifoveolata*, Mayr, 1871, Verh. zool.-bot. Ges. Wien, 21: 416.

*Zaitha bifoveolata*, Walker, 1873, Cat. Hem. Het. Brit. Mus., 8:179.

*Zaitha bifoveolata*, Montandon, 1895, Bol. Mus. Zool. Anat. Comp., Torino, 10: 10.

*Belostoma bifoveolatum*, Montandon, 1903, Bull. Mus. Hist. Nat. Paris, 9: 23.

*Belostoma bifoveolatum*, Kirkaldy and Bueno, 1909, Proc. Ent. Wash., 10: 190.

*Belostoma bifoveolatum*, DeCarlo, 1930, Rev. Ent. Soc. Arg., no. 13 : 115, pl. 5, fig. 7.

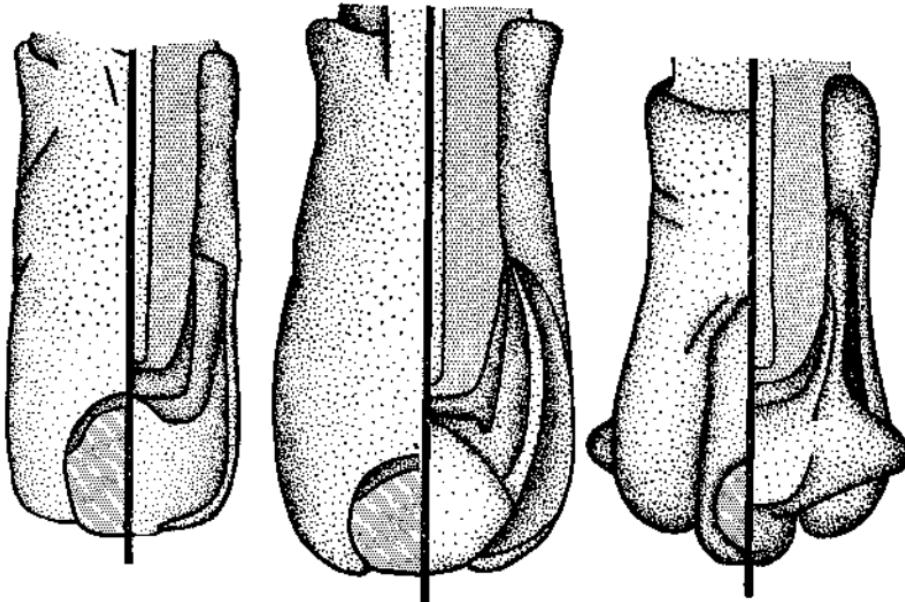
*Belostoma bifoveolatum*, DeCarlo, 1935, Nov. Reunion Soc. Arg. Pat. Reg. N.

Mendoza, no. 202: 1472, fig. 3.

*Belostoma bifoveolatum*, DeCarlo, 1935, Rev. Chilena Hist. Nat., 34: 108.

*Belostoma bifoveolatum*, DeCarlo, 1938, An. Mus. Arg. Cien. Nat., 39 : 231, pl. 7, fig. 69.

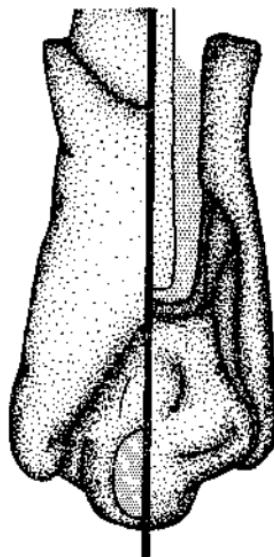
*Size and shape.* Body ovoid, slightly dilated. Length : d d, 19.0-23.8 mm. ; 9 9, 21.0-26.0 mm. Width : d d, 9.2-11.5



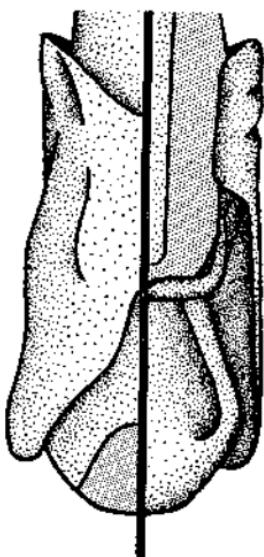
105

106

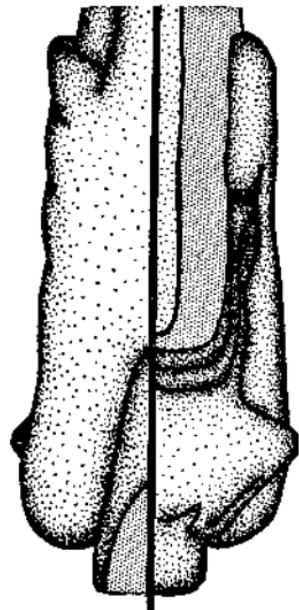
107



108



109



110

Figures 105 through 110

Dorsal and ventral aspect of genitalia. 105, *B. bifoveolatum*; 106, *B. angustum*; 107, *B. flumineum*; 108, *B. bakeri*; 109, *B. saratoga*; 110, *B. lutarium*.

mm. ; 9 9 , 9.5-12.0 mm. Width of head, 4.1-5.0 mm. ; width of pronotum, 6.2-8.5 mm. ; length of pronotum, 3.1-4.0 mm.

*Color and markings.* Dark brown to olive-gray. Scutellum with dark anterior portion and light caudal part ; thoracic venter light brown to reddish-brown. Banding of legs if present, faint and obscure ; legs usually uniformly brown. Abdominal venter yellowish to reddish-brown ; connexivum usually uniformly brown, sometimes with two faint marginal spots on each segmental margin.

*Structural characteristics.* Interocular space 1.5 to 1.7 times the width of an eye ; clypeus not reaching the ocular line ; anteculus subequal to interoculus. Pronotum with lateral margins nearly straight, slightly concave ; scutellum less than half as wide as hemelytra. Pilosity of connexivum extending along three-fourths to nearly the tip of the genital operculum. Genitalia as shown in figures 99 and 105.

*Comparative notes.* *B. bifoveolatum* is the most robust species of this group. The pronotum is not as concave, and the scutellum is less than half as wide as the hemelytra.

*Special variations.* This species varies considerably in size. However this variation does not seem to correspond to geographical distribution. Small specimens resemble *B. elegans* in shape but are usually slightly more ovoid.

*Types.* Specimens used by Spinola are apparently lost. Thus, a male from El Tofo, Chile (KU) is proposed as a neotype. The neotype is 23.8 mm. long and 11.5 mm. wide.

*Distribution.* *B. bifoveolatum* is known from Argentina and Chile. Specimens from the following localities have been identified :

ARGENTINA. 9 (KU). BUENOS AIRES : d' (DC), 2 ea (KU). CATAMARCA : d' (DC), d' (HNM). CORDOBA : La Granja, 4 d' di, 4 9 9 (KU). LA PAMPA : d', 2 9 (FU). LA RIOJA : 2 cr, 9 (DC). MENDOZA : Mendoza, 9 (USNM) . RIO NEGRO : Neuquén, 9 (KU) , 2 d' (USNM) . SALTA : Piquete, 9 (DC) ; San Pedrido, cr (DC). TUCUMÁN :

(USNM).

CHILE. 9 (MSU) ; Miramar, 21 cr 7 9 9 (KU) , 7  
cp 10 9 9 (KU), cr (MC), 9 (Ms), c3', 2 9 9 (USNM).  
CAUTÍN: Temuco, (MSU) . CONCEPCIÓN: 9 (MSU) . CO-  
QUIMBO : Coquimbo, 3 d' (CNMH) ; El Tofo, 5 ea, 15 9 9

(AMNH). LINARES : Linares, cr (MC) . LLANQUIHUE : Puerto Montt, 3' (HNM) . MALLECO : Angel, 3 6 .6 (CU), 16 d d , 14 9 9 (MSU), 4 a , 2 9 9 (USNM). MAULE : Termas Cauquenes, 9 (KU). SANTIAGO : Maipu, d (UC) ; Santiago, 2 di d (KU), a (MC), 6 (USNM). VALPARAISO : Limache, 8 d' 6 , 13 9 9 (KU) ; Valparaiso, 5 9 9 (DC), d' (MS) ; Villa, 24 d' , 12 9 9 (KU) .

*Belostoma angustum* n. sp.

Figures 100, 106

*Size and shape.* Elongate, thick bodies. Length : , 21.0-  
23.5 mm. ; 9 9 , 21.5-24.5 mm. Width : d' a, 9.6-10.6 mm. ;  
9 , 9.6-10.9 mm. Width of head, 4.3-4.8 mm. ; width of pronotum, 6.9-8.2  
mm. ; length of pronotum, 3.2-4.0 mm.

*Color and markings.* Dark brown. Scutellum usually with dark anterior portion and light caudal part ; thoracic venter and abdomen dark brown. Legs without banding, except three faint bands on protibia. Connexivum without markings.

*Structural characteristics.* Interocular space 1.4 to 1.6 times the width of an eye ; clypeus usually reaching the ocular line ; anteculus subequal to slightly shorter than interoculus. Pronotum with concave lateral margins ; scutellum about half as wide as hemelytra. Pilosity of connexivum extending along half to three-fourths the margin of the genital operculum. Genitalia as shown in figures 100 and 106.

*Comparative notes.* *B. angustum* n. sp. is very similar to *B. elegans* in shape and structure. It is generally larger and more robust than *B. elegans*. Also the clypeus usually extends to the ocular line (one paratype has a clypeus that does not extend to the ocular line) .

*Types.* Holotype, d , and allotype, 9 , from Cochabamba, Bolivia (KU) ; di and 3 9 9 paratypes from the same locality ; d' and 2 9 9 paratypes from Yungas de Arepucho Sihuencas, Bolivia ; 6 and 9 paratype from Cochabamba, Mt. Punka, Bolivia. The holotype and allotype will be placed in the Francis Huntington Snow Collections, University of Kansas. Remaining paratypes will be placed at BM, USNM, L. The holotype measures ; length, 21.0 mm. ; width, 9.6 mm. The allotype is 23.0 mm. long and 9.7 mm. wide.

*Distribution.* Known only from the type series from Bolivia.

### *Belostoma flumineum* group

Moderately sized, elliptical species ranging from 15.5 to 27.5 mm. long.

Anteoculus three-fourths or longer than the interoculus ; clypeus extending nearly to, or reaching, the ocular line ; interoculus broad, about twice the width of an eye ; eyes about as long as wide ; segment I and II of beak nearly subequal. Prosternal keel rounded, nearly semicircular ; scutellum not quite reaching the nodal line. Abdominal pilosity covering the entire connexivum, except for a very narrow mesal stripe in the case of *B. lutarium* (Stål). Genitalia as illustrated for the species.

This group is closely related to the *B. minor* group but differs from the latter group by the longer anteoculus and pilosity of the connexivum. It is also similar to the *B. bifoveolatum* group and differs from these by the more complex male genitalia. They are separated from one another by distribution.

This group is North American in distribution and contains four species which may be distinguished by the following key.

#### Key to the species of the *flumineum* group

1. Anteoculus longer than interoculus ; narrow strip of mesal connexivum without pilosity - - - *B. lutarium* (Stål). Anteoculus not longer than interoculus ; pilosity completely covering connexivum - - - - 2.
2. Anteoculus equal to the interoculus ; clypeus not reaching the ocular line - - - - 3.  
Anteoculus about three-fourths the length of interoculus ; clypeus reaching ocular line - - - - - *B. bakeri* Montandon.
3. Lateral margins of pronotum nearly straight ; caudal air-straps as shown in fig. 105. *B. saratogae* Menke. Lateral margins of pronotum concave ; caudal air-straps as shown in fig. 106 - - - - - *B. flumineum* Say.

### *Belostoma flumineum* Say

Figures 101, 107

*Belostoma flumineum* Say, 1831, Descript. New Species N. Amer. Insects, 12-13.

*Belostoma fluminea*, Say, 1832, New Species N. Amer. Insects, p. 32.

*Perthostoma auranticum* Leidy, 1843, *Jour. Acad. Nat. Sci. Phil.* 1: 60, 66. (also as var. *immaculatum*).

*Zaitha fluminea*, Dufour, 1863, *Ann. Ent. Soc. France*, (4)3 : 388.

*Zaitha fluminea*, Mayr, 1871, *Verh. zool.-bot. Ges. Wien*, 21: 416.

*Zaitha fluminea*, Walker, 1873, *Cat. Hem. Het. Brit. Mus.*, 8: 179.

*Zaitha fluminea*, Uhler, 1876, *Bull. U. S. Geol. Geog. Survey Terr.* 1 (5), 2nd series: 338. (p. 72 of reprint).

*Zaitha fluminea*, Uhler, 1878, *Proc. Bost. Soc. Nat. Hist.*, 19: 441.

*Zaitha fluminea*, Uhler, 1884, *Standard Nat. Hist.*, 19: 441.

*Zaitha fluminea*, Popanoe, 1885, *Trans. Kansas Acad. Sci.*, 9: 63.

*Zaitha fluminea*, Provancher, 1886, *Petite Faune Ent. Can.*, 3 : 198, pl. 4, fig. 6.

*Zaitha fluminea*, Uhler, 1886, *Checkl. Hem. Het. N. Amer.*, p. 28.

*Zaitha fluminea*, Van Duzee, 1894, *Bull. Buff. Soc. Nat. Sci.*, 5: 185.

*Zaitha micrantula* Gillette and Baker, 1895, *Colorado Agr. Exp. Sta. Bull.*, 31: 63.

*Belostoma fluminea*, Scudder, 1899, *Psyche*, 8: 307, 400.

*Belostoma fluminea*, Montandon, 1903, *Bul. Soc. Rom. Sci. Bucarest*, 12 : 113.

*Belostoma flumineum*, Bueno, 1905, *Jour. N. Y. Ent. Soc.*, 13 : 44.

*Belostoma flumineum*, Bueno and Brimley, 1907, *Ent. News*, 18 : 435.

*Belostoma flumineum*, Bueno, 1908, *Jour. N. Y. Ent. Soc.*, 16 : 237.

*Belostoma flumineum*, Kirkaldy and Bueno, 1909, *Proc. Ent. Soc. Wash.*, 10: 191.

*Belostoma flumineum*, Montandon, 1909, *Bul. Soc. Rom. Sci. Bucarest*, 18: 187-188. (including var. *immaculatum* Leidy)

*Belostoma fluminea*, Smith, 1910, *Ann. Rept. N. J. State Mus.*, p. 168.

*Zaitha fluminea*, Banks, 1910, *Cat. Nearct. Hem. Het.*, p. 9.

*Belostoma flumineum*, Bueno, 1912, Can. Ent., 44: 213.

*Belostoma flumineum*, Barber, 1914, Bull. Amer. Mus. Nat. Hist., 33: 498. (questionable).

*Belostoma fluminea*, Van Duzee, 1916, Checkl. Hem. N. Amer., p. 52-53. (including var. *immaculata*).

*Belostoma flumineum*, Van Duzee, 1917, Univ. Calif. Publ. Ent., 2: 467-468. (including var. *immaculatum*).

*Belostoma flumineum*, Hussey, 1919, Occ. Pap. Mus. Zool. Univ. Michigan, 75: 21.

*Belostoma flumineum*, Hungerford, 1920, Univ. Kansas Sci. Bull., 21: 144-148, pl. 2, fig. 9.

*Belostoma flumineum*, Britton, 1920, Conn. State Geol. Nat. Hist. Surv. Bull., 31: 66.

*Belostoma flumineum*, Hussey, 1920, Occ. Pap. Mus. Zool. Univ. Michigan, 115: 20.

*Belostoma flumineum*, Hussey, 1922, Occ. Pap. Mus. Zool. Univ. Michigan, 118: 39.

*Belostoma fluminea*, Osborn and Drake, 1925, Tech. Publ. N. Y. State Coll. For., 16: 86, figs. 34, 36.

*Belostoma flumineum*, Bueno, 1923, Conn. State Geol. Nat. Hist. Surv. Bull., 34: 398-399, pl. 16, fig. 6.

*Belostoma flumineum*, Hungerford and Beamer, 1925, Ent. News, 36: 298-299.

*Belostoma flumineum*, Hungerford, 1925, Psyche, 32: 91, pl. 2, fig. 1.

*Belostoma flumineum*, Blatchley, 1926, Het. East. N. Amer., p. 1046-1047, fig. 211.

*Belostoma flumineum*, Leonard, 1928, Cornell Univ. Agr. Exp. Sta. Mem., 101: 140.

*Belostoma flumineum*, Harris, 1937, Iowa State Coll. Jour. Sci. 11: 176.

*Belostoma flumineum*, DeCarlo, 1938, An. Mus. Arg. Cien. Nat., 39: 232-233, pl. 7, fig. 71.

*Belostoma flumineum*, Brimley, 1938, Insects N. Carolina, p. 84.

*Belostoma flumineum*, Millspaugh, 1939, Field Lab., 7: 81.

*Belostoma flumineum*, Hussey and Herring, 1950, Fla. Ent., 33: 156. (var. *immaculata* Leidy).

*Belostoma flumineum*, Ellis, 1952, Amer. Mid. Nat., 48: 326327.

*Belostoma bakeri*, Ellis, 1952, Amer. Mid. Nat., 48: 327. *Belostoma flumineum*, Penn, 1952, Proc. Louisiana Acad. Sci., 15: 51.

*Belostoma bakeri*, Penn, 1952, Proc. Louisiana Acad. Sci., 15: 51.

*Belostoma flumineum*, Usinger, 1956, Aquatic Insects Calif., p. 206.

*Belostoma flumineum*, Roback, 1958, Trans. Amer. Ent. Soc., 84: 8.

*Belostoma flumineum*, Menke, 1958, Bull. So. Calif. Acad. Sci., 57: 160-162, figs. 1, 7, 9.

*Belostoma flumineum*, Wilson, 1958, Tulane Studies Zool., 6: 152.

*Belostoma flumineum*, Lauck, 1959, Bull. Chicago Acad. Sci., 11(1): 9.

*Belostoma fluminea*, Froeschner, 1962, Amer. Mid. Nat., 67 (1): 232.

*Belostoma flumineum*, Schaefer and Drew, 1964, Southw. Nat., 9 (2): 100.

*Size and shape.* Elliptical-ovoid body. Length : d e, 19.523.5 mm. ; y y , 18.5-24.8 mm. Width : d d, 9.4-11.6 mm. ; , 9.2-12.2 mm. Width of head, 3.8-4.5 mm. ; width of pronotum, 6.3-7.8 mm. ; length of pronotum, 2.9-3.8 mm.

*Color and markings.* Brown, suffused with yellow. Thoracic venter light brown, spotted with black or dark brown. Profemur with three distinct dark bands, each meso- and metafemur with two or three irregular, often obscure, dark bands ; protibia with three regular dark bands, meso- and metatibia with three irregular bands ; pro- and mesotarsi with dark apical tips, metatarsi dark. Abdominal venter brown to reddish-brown with darker patches ; connexival margin yellowish-brown.

*Structural characteristics.* Interocular space 1.6 to 1.8 times the width of an eye ; anteoculus subequal to interoculus ; beak long and slender. Pilosity completely covering connexivum, extending about two-thirds along the margin of the genital operculum. Genitalia as shown in figures 101 and 107.

*Comparative notes.* The anteoculus of *B. flumineum* is intermediate between *B. lutarium* and *B. bakeri*. Although the anteoculus and interoculus are subequal in both *B. flumineum*

and *B. saratogae*, the anteoculus of *B. flumineum* is distinctly longer. The comparative similarity is due to the much shorter interoculus of *B. saratogae*.

*Special variations.* Specimens of populations from the southwestern desert regions are generally smaller in size. At the University of Michigan are 2 and a male from Murfreesboro, Rutherford Co., Tennessee, with the general appearance and size of the northern form of *B. lutarium*, ranging from 22.2 to 24.8 mm. long and 11.6 to 12.2 mm. wide. However, these specimens have the structural characteristics of *B. flumineum*.

*Types.* The original specimens of Say have been lost and a male (KU) from "Lebanon Co., Pa., P. J. Spangler, Mt. Cretna, Colebrook Ice Pond" is proposed for a neotype. Pennsylvania is listed as one of the type localities by Say. The neotype is 20.8 mm. long and 10.3 mm. wide.

*Nomenclature.* Judging by the localities cited, Say possibly had both *B. flumineum* and *B. lutarium*. However, his description of the anteoculus more closely fits *B. flumineum*.

*Distribution.* *B. flumineum* has the most extensive range of the North American species of the genus. It occurs in the southern half of Canada, throughout the United States, and in northern Mexico. In the United States it becomes rather scarce where the range overlaps with that of *B. lutarium*. Specimens from the following localities have been identified :

#### CANADA.

BRITISH COLUMBIA : *Kamloops Co.*, 2 d, 9 (BC), 9 (DC).

MANITOBA : *Aubbenaubbec*, (USNM) ; St. Norbert, d (DC).

ONTARIO: *Essex Co.*, Detroit River near Fighting Island, 9 (MU) ; *Grenville Co.*, Cardinal, 2 a a, 2 9 (MU) ; *Hastings Co.*, d (DC) ; *Lambton Co.*, Woodflick Island, 3 d e 9 (MU) ; *Russel Co.*, d' (DC) ; *York Co.*, 3 d d (AMNH).

QUEBEC: Outremont, d' (DC) ; *Larval Co.*, 9 (AMNH) ; *Levis Co.*, St. Jean, (DC) ; *Vaudrevil-Soulanges Co.*, Como, 3 (BC).

UNITED STATES. d, 3 9 (AMNH), , 9 (CU), d

(KU), 9 (MU), d (UC), 2 *d'* a , (USNM) ; Am. Bor., *c?*  
 (MS) ; New England, 9 (AMNH).

ALABAMA : *Blount Co.*, *e*, 9 (MU).

ARIZONA : Quitobaquito, 0. P. C. Nat. Mon., 2 9 9 (CU) ;  
*Gila Co.*, *e*, 9 (KU), Miami, 4 *d'* a, 4 9 9 (KU) ; *Maricopa Co.*, Arlington, *d*, 4 9 9 (KU) ; Littlefield, 2 6 6 (MU) ;  
*Pinal Co.*, Arboretum, 6 (MU) ; Yuma *Co.*, 6, 9 (KU). ARKANSAS : *Washington Co.*, Fayetteville, *d*, 9 (KU). CALIFORNIA : S. Cal., .6, 9 (USNM) ; *Fresno Co.*, Fresno, d' (USNM) ; Waltham Creek, 9 (MC) ; *Imperial Co.*, Brawley, *a*, 5 9 (CU) ; *Los Angeles Co.*, Pine Canyon, Hidden Lake, 2 9 9 (MC) ; *San Bernardino Co.*, Needles, 6 (ISU) ;  
*Yolo Co.*, Davis, (MC) ; Winters, 5 *e e*, 2 9 (DU). CONNECTICUT : What., 2 *e 9* (UC) ; *Hartford Co.*, Bristol, *a* (UC) ; *Litchfield Co.*, Cornwall, *d*, 2 9 9 (AMNH) ; Litchfield, 2 *a a*, 9 (AMNH) ; *New Haven Co.*, 2 *e e*, 2 9 '9 (KU) ; *Tolland Co.*, Storrs, *c r*, 7 9 (UC). DISTRICT OF COLUMBIA : Pine Br., 5 *e a*, 2 Washington, 6 *a a* (CU), *a* (MU), *a* (USNM). COLORADO : *Puebla Co.*, Puebla, *a* (CU). FLORIDA : *Pinellas Co.*, St. Petersburg, 6 (CU). ILLINOIS : (over 350 specimens (L, INHS) from 51 different counties) ; (AMNH), 2 *a' e* (MS) ; *Boone Co.*, Belvidere, 6 (UC) ; *Calhoun Co.*, Hardin, 5 · (CU) ; *Champaign Co.*, Urbana, 9 (UC), 2 9 9 (USNM) ; *Cook Co.*, Chicago, 2 6 *a* (KU), 9 (MU), *e* (USNM) ; Edgebrook, *a* (MU) ; S. Evanston, *c*, 9 (MU) ; Glenview, *d* (MU), Park Ridge, *d* (UC) ; *DuPage Co.*, Glen Ellyn, 9 (PC) ; *Lake Co.*, Lake Forest, *e* (CU). INDIANA : *e*, (CNHM), *Lake Co.*, Buffington, 6 (CNHM), Miller ; *a* (CNHM) ; Wolf Lake, *cp*, 9 (CNHM) ; *Porter Co.*, Dune Park, 3 *a' e*, (CNHM) ; *St. Joseph Co.*, Pine, 3 *cf*, 3 (CNHM), 9 (PC) ; *Tippecanoe Co.*, Lafayette, *e*, 9 (MU) ; North of Romney, 9 (MU). IOWA : *Boone Co.*, 2 *d 6*, (UC), 21 *d i c r*, 22 9 9 (ISU) ; *Cerro Gordo Co.*, Clear Lake, *e* (UC) ; *Hamilton Co.*, Little Well Lake, 9 (ISU) ; Webster City, *a'* (ISU) ; *Iowa Co.*, *a'* (ISU) ; *Page Co.*, Shenandoah, 2 *di a* (ISU) ; *Polk Co.*, Allerman, 9 (UC) ; *Story Co.*, Ames, 6 *a a*, 2 9 9 (ISU) ; Scope's

Mill Dam, 3 9 9 (ISU) ; *Van Buren Co.*, Lacey-Keosaugua St. Pk., 6 , 9 (UC).  
 KANSAS: 6 (MSU) ; *Atchinson Co.*, 2 6 6 , 4 9 9 (KU) ; *Butler Co.*, 9  $\beta'$  , 5 9 9 (KU) ; *Cherokee Co.*, 30 *di d*, 16 9 (KU) ; *Cheyenne Co.*, 3 *a a* (KU) ; *Comanche Co.*, Coldwater, 4 *de*, 5 9 9 (KU) ; *Doniphan Co.*, 7 *cr c3'*, 5 9 9 (KU) ; *Douglas Co.*, *di* , 9 (KU), Lawrence, 9 (KU) ; *Edwards Co.*, Kinsley, 6 (MU) ; *Franklin Co.*, *d'* , 2 9 9 (MU) ; *Greeley Co.*, 9 (KU) ; *Pratt Co.*, 6 , 5 9 9 (KU) ; *Sumner Co.*, ington, 6 , 9 (MSU).

KENTUCKY: *Bell Co.*, Cumberland River, 3 *di 6* (MU) ; *Jefferson Co.*, Louisville, *scr*, 3 9 9 (CU).

LOUISIANA: *Orleans Par.*, New Orleans (City Park) , 3 *di* (USNM).

MAINE: *Cumberland Co.*, Casco, 2 *ed*, 3 9 9 (CU) ; *Penobscot Co.*, Crono, 9 (MC).

MARYLAND: Great Falls, *d'* (CU).

MASSACHUSETTS: *Berkshire Co.*, Lee, *di* (AMNH) ; *Hampshire Co.*, Amherst, *d'* , 9 (KU) ; *Norfolk Co.*, Milton, *d* (MU) ; *Plymouth Co.*, Howlett's Pond, *c3'* (USNM) ; *Suffolk Co.*, Forest Hills, 9 (MU), 9 (AMNH) ; *Worcester Co.*, Southboro, *e* (AMNH) .

MICHIGAN: *Allegan Co.*, *e* (MU), Thornapple River, 2 *d* , 3 9 9 (MU) ; *Alcona Co.*, Thunder Bay River, 2 9 9 (MU) ; *Alpena Co.*, Black Creek, *d'* 9 (MU), Devil River, *d'* (MU) ; *Barry Co.*, Gull Lake, 5 6 , 9 9 9 (MSU) ; *Otis Lake*, *cr* , 9 (MSU) ; *Berrien Co.*, *e* (MU) ; *Benton Harbor*, 9 (MU) ; E. K. Warren Preserve, Sawyer Dunes, 14 *d' e* , 13 9 9 (MU) ; Warren Woods, 9 (MU) ; Lakeside, Galien River, 9 (CNHM) ; New Buffalo, 5' (MU) ; *Calhoun Co.*, Battle Creek, 9 (FU) ; *Charlevoix Co.*, Thumb Lake, 2 9 9 (MU) ; *Cheboygan Co.*, 10 6 6 , 6 9 9 (MU), 2 9 9 (KU) , 6 *d d* , 2 9 9 (MSU) , 3 9 9 (MU) ; *Douglas Lake*, 2 *di 6* , 9 (FU), 3  $\beta'$  , 2 9 9 (KU) , 3 *di 6* , 3 9 9 (MU) ; *Bessey Creek*, *d'* , 9 (KU) ; *Smith's Bog*, 5 *d' cr* (KU) ; *Chippewa Co.*, Henry River, 6 (MU) ; *Cass Co.*, 9 (MU) ; *Pokagon*, *d'* (MU) ; *Grand Traverse Co.*, Acme, 6 , 9 (MU) ; *Boardmans River*, 2 *c3'* (MU) ; *Keystone*, 6 , 2 9 9 (MU) ; *Mayfield*, *d* (MU) ; *Traverse City*, 9 (MSU) ; *Houghton Co.*, *di* (MU) ; *Houghton Lake*, 6 , 9 (MSU) ; *Huron Co.*, 2 9 9 (MU) ; *Port Austin*,

2<sub>6</sub>6 (MU) ; *Ingham Co.*, 22 6 6, 38 9 (MSU) ; *Campus*, 2 9 9 (MSU) ; *Gravel Pit*, e, 2 9 9 (MSU) ; *Agriculture College*, d (MSU) ; *East Lansing*, 9 (MSU) ; *Haslett*, 5 6 4 y 9 (MSU) ; *Lansing*, 6 (MU) ; *Iosco Co.*, .6 (MU) ; *Au Sable River*, 2 d d (MU) ; *Mason Co.*, *Bass Lake Inlet*, d, y (MU) ; *Oscoda*, 3 6 6 (MU) ; *Isabella Co.*, 3 6 d, 4 9 (MU) ; *Jackson Co.*, *Grand River*, 3 .6 6, 9 (MU) ; *Tompkin's Twp.* 4 6, 4 9 9 (MU) ; *Kalamazoo Co.*, 9 (MSU) ; *Kalamazoo*, 9 (MU) ; *Kalkaska Co.*, *Crawford Lake*, 5 d (MU) ; *Papose Lake*, 2 d 6 (MU) ; *Rainbow Lake*, 2 9 9 (MU) ; *Kent Co.*, 9 (MU) ; *Grand River Drain*, 9 (MU) ; *Big Cedar Creek*, 8 6 d, 11 9 9 (MU) ; *Lake Co.*, *Lake Twp.*, 2 9 9 (MU) ; *Lenawee Co.*, *Riley Creek*, 6 (MU) ; *Tiffin River*, d (MU) ; *Livingston Co.*, *Anderson*, y (MU) ; *E. S. George Reserve*, 5 d d, 3 9 9 (MU) ; *Lakeland*, 9 (FU) ; *Pinckney Mill Pond*, 2 6 6 (MU) ; *Luce Co.*, *Tahquamenon River*, d (MU) ; *Macomb Co.*, *Utica*, 9 (MU) ; *Manistee Co.*, 9 (MU) ; *Marquette Co.*, *Marquette*, d, (AMNH) ; *Mason Co.*, *Base Lake Inlet*, a, 9 (MU) ; *Mecosta Co.*, 6 (MU) ; *Muskegon Drain*, 9 (MU) ; *Monroe Co.*, *Raisin River*, a, 2 9 9 (MU) ; *Mt. Morenay Co.*, 3 6 a, 3 9 9 (KU) ; *Muskegon Co.*, e, 9 (MU) ; *Silver Creek*, 2 9 9 (MU) ; *Steadman Lake*, 6 (MU) ; *Newaygo Co.*, *Crokery Creek*, 9 (MU) ; *Greenwood Creek*, 2 9 9 (MU) ; *St. Joseph Co.*, *Nottawa*, 9 (MSU) ; *Oakland Co.*, 2 9 9 (MU) ; *Lakeville*, 2 a a (MU) ; *Walnut Lake*, 9 (MU) ; *Otsego Co.*, *Otsego State Park*, 2 6 6, 9 (MU) ; *Ottawa Co.*, *Macatawa B'h*, d (CNHM) ; *St. Clair Co.*, d (MU) ; *Marine City*, 9 (MU) ; *Port Huron*, 9 (MU) ; *St. Joseph Co.*, 3 6 d, 4 9 9 (MU) ; *Saginaw Co.*, 2 d d, 4 9 9 (MU) ; *Burt Lake*, 9 (KU) ; *Cass River*, 9 (MU) ; *Misteaugey River*, 6 (MU) ; *Swan Creek*, 9 (MU) ; *Sanilac Co.*, *Big Creek*, ,e' 2 9 9 (MU) ; *Lake Huron*, cp (MU) ; *Shiawassee Co.*, d (MU) ; *Tuscola Co.*, 9 (MU) ; *Van Buren Co.*, 6 (MSU), d (MU) ; *McKeown Creek*, 3 6 6 (MU) ; *Bangor*, a (MU) ; *South Haven*, 6 (CNHM) ; *Washtenaw Co.*, 2 d d, 9 (FU), 8 a cr, 6 9 9 (MU) ; *Ann Arbor*, 6, 3 9 9 (FU), 16 6 a, 16 9 9 (MU) ; *Geddes Overflow*, d (MU), 6, 2 9 9 (MU) ; *Pittsfield*, se, 9 (FU), 6, 9 (MU) ; *White's Woods Pond*, 9 (MU) ; *Whitmore Lake*, 6 (MU) ; *Wayne Co.*, *Detroit*, 9 (MU).

MINNESOTA : 9 (FU), 17 <i>d'</i> , 79. (KU) ; <i>Goodhue Co.</i> , Kenyon, (PC) ; <i>Hennepin Co.</i> , Minneapolis, 2 9 9 (FU) ; <i>Itasca Co.</i> , 2 <i>d</i> , 3 (FU), 9 (MU) ; St. Paul, di, 2 9 9 (FU), 9 (MU), 16 <i>d d</i> , 26 9 (L) ; 3 mi. W. Ely, <i>d'</i> (L) ; Eveleth,	2 9 9 (KU) ; <i>Ramsey Co.</i> , 2 (KU) ; <i>St. Louis Co.</i> , Eaglenest Lake, 3 <i>d</i> , 2 <i>y y</i> 9 (KU).
MISSISSIPPI: <i>Harrison Co.</i> , Lyman, 3 <i>cr</i> , 3 9 (UC)	
MISSOURI: <i>se</i> (USNM), <i>d'</i> (KU), <i>e</i> (MSU) ; <i>Boone Co.</i> , Rocheport, (CU) ; <i>Greene Co.</i> , <i>d</i> (CU) ; <i>Jefferson Co.</i> , 2 9 9 (MU) ; <i>Lawrence Co.</i> , Marionville, 2 <i>d d</i> (MU) ; <i>Ozark Co.</i> , Dora, <i>cr</i> , 9 (CNHM) ; <i>St. Louis Co.</i> , <i>cr</i> , 9 (CU) ; <i>Howard Bend</i> , 3 <i>d</i> , 9 (CU).	9
NEBRASKA : <i>d</i> , 9 (MSU)	
NEVADA : 2 <i>d</i> (USNM) ; <i>Clark Co.</i> , Warm Springs, 2 9 9 (MC) ; Muddy River, <i>d</i> (MU).	
NEW HAMPSHIRE : <i>Coos Co.</i> , Mount Washington, 9 (AMNH) ; <i>Grafton Co.</i> , Bath, 2 <i>e e</i> , 3 9 9 (KU).	
NEW JERSEY : 3 <i>cr</i> , 4 9 9 (AMNH), 9 (MU) ; <i>Bergen Co.</i> , Palisades, 9 (AMNH), 9 (NC) ; <i>Fort Lee</i> , 2 9 9 (AMNH) ; <i>Camden Co.</i> , <i>cr</i> (CNHM) ; <i>Essex Co.</i> , Bloomfield, 2 9 9 (CNHM) ; <i>Passaic Co.</i> , Paterson, <i>cr</i> (AMNH).	
NEW MEXICO : <i>Bernalillo Co.</i> , Albuquerque, <i>d</i> (MSU), 3 <i>d d</i> , 9 (ISU) ; <i>Dona Ana Co.</i> , Mesilla Park, <i>d'</i> , 3 9 9 (KU).	
NEW YORK : 2 9 9 (AMNH), (CU), <i>d</i> (USNM) ; Long Island, 17 . 6 <i>e</i> , 22 9 9 (AMNH) ; <i>Cayuga Co.</i> , North Fair Haven, <i>d</i> (CU) ; Springlake, 9 (CU) ; <i>Erie Co.</i> , Buffalo, 9 (ISU) ; <i>Kings Co.</i> , Coney Island, 2 9 9 (AMNH) ; New York City, <i>a</i> , 9 (AMNH) ; <i>Monroe Co.</i> , Hilton, <i>d</i> , 9 (CU) ; <i>Orange Co.</i> , West Point, <i>e</i> , 9 (USNM) ; <i>Richmond Co.</i> , Staten Island, 2 <i>o'</i> , 5 9 9 (AMNH) ; <i>Rockland Co.</i> , 2 9 9 (UC) ; <i>St. Lawrence Co.</i> , Potsdam, 3 <i>d sd</i> (CU) ; <i>Suffolk Co.</i> , Yaphank, 9 (AMNH) ; <i>Tompkins Co.</i> , Ithaca, <i>e</i> (AMNH), 5 <i>cr</i> , 10 9 9 (CU), (KU), <i>e</i> , 9 (USNM) ; <i>Westchester Co.</i> , Yonkers, .6 (AMNH) ; White Plains, 3 9 9 (MU).	
NORTH CAROLINA : (CU).	
NORTH DAKOTA : <i>Cass Co.</i> , Fargo, <i>d</i> (KU), , 9 (KU) ; <i>Pembina Co.</i> , <i>Pembina River</i> , <i>cr</i> (MU) ; <i>Ransom Co.</i> , Lisbon, <i>e</i> (MU) ; <i>Walsh Co.</i> , Grafton, <i>d</i> (MU).	
OHIO: (MSU) ; <i>Erie Co.</i> , Castalia, <i>d</i> (MU).	
OKLAHOMA : <i>Carter Co.</i> , Ardmore, 9 (KU) ; <i>Payne Co.</i> ,	

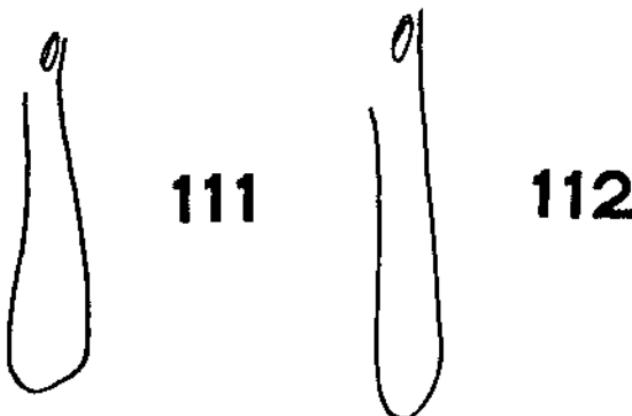
Stillwater, *o* (CU).

OREGON : Cascade Mts., 9 (KU) ; *Benton Co.*, Corvallis, d (BC) ; *Marion Co.*, Salem, (USNM).

PENNSYLVANIA : *Lebanon Co.*, Mt. Creyna, 3 .5' 2 9 9 (KU) ; *Philadelphia Co.*, Philadelphia, d' (FU), , 9 (MC), 4 ea, 3 9 9 (CNHM), 2 y 9 (CU).

SOUTH DAKOTA : Clay Co., Vermillion River, 9 (MU); *Pennington Co.*, Wasta, 9 (KU) ; *Todd Co.*, Rosebud Indian Reserve, *di* (MU).

TENNESSEE : *Rutherford Co.*, Murfreesboro, 299 (MU).



Figures 111, 112

Caudal airstrap. 111, *B. bakeri*; 112, *B. saratogae*.

TEXAS: , (USNM), 4 *d*, 9 (KU), , (MS);  
*Arkansas Co.*, 4 3' 3 9 9 (KU) ; *Brooks Co.*, *di* (KU) ;  
*Cameron Co.*, *d*, 9 (KU) ; *Brownsville*, .6 (CNHM), 12 , 9 9 9 (MU), *d'* (USNM) ; *Colorado Co.*, *di* (KU) ; *Dallas Co.*, *Dallas*, 9 (MU) ; *Hidalgo Co.*, *Edinburgh*, *d'* (MU) ; *Progreso*, *d'* 5 9 9 (KU) ; *Kleberg Co.*, *Kingsville*, 2 *e*, 3 9 9 (CU) ; *McLennan Co.*, *Waco*, *a* (USNM) ; *Montague Co.*, *Forestburg*, 9 (CNHM) ; *Uvalde Co.*, *Sabinal*, *d* (KU) ; *Val Verde Co.*, *Del Rio*, 6 c3' *e*, 5 9 9 (KU) ; *Webb Co.*, *Laredo*, (MU) .

VIRGINIA : *Fairfax Co.*, *Alexander*, *d* (USNM) ; *Norfolk Co.*, *Norfolk*, *d'* (KU).

WISCONSIN : *d'* (MU), 9 (USNM) ; *Burnett Co.*, *Grants*

*Berg*, *d* (MU) ; *Eau Claire Co.*, (MU) ; *Columbia Co.*,  
*Kilbourn*, 3' (MU) ; *Dane Co.*, *Lake Wingra*, 9 (KU) ;

Lake Winn, 9 (KU) ; *Dodge Co.*, Atwater, 9 (MU) ;  
*Douglas Co.*, Brule, d' (KU) ; *Kenosha Co.*, Wheatland, 3  
d (MU) ; *Lafayette Co.*, Argyle, 9 (MU) ; *Milwaukee Co.*, Milwaukee, cr (KU) ;  
*Polk Co.*, Avery, 9 (MU) ; *St. Croix Co.*, Hudson, d, 9 (MU) ; Tarzwell, 9 (MU) ;  
*Sauk Co.*, a (MU) ; Devil's Lake, cr, 2 9 9 (MU) ; *Washburn Co.*, 9 (MU) ;  
*Waukesha Co.*, Mukwanago Fox River, e (MU) ; Muskego, 9 (KU) ;  
*Vilas Co.*, Squaw Lake, d' (ISU).

MEXICO.

CHIHUAHUA: Camargo, 3 cp (5) (KU) ; Rio Conchos, , 9  
(M C).

SONORA: 9 (USNM).

***Belostoma bakeri* Montandon**

Figures 102, 108, 111

*Zaitha fusciventris*, Uhler, 1875, U. S. Army Eng. Dept. Rept. Geog. Geol. Expl. Surv. W. 100th Mer., 5 : 840. (probably in part).

*Zaitha fusciventris*, Uhler, 1876, Bull. U. S. Geol. Geog. Survey Terr. 1 (5), 2nd series : 338—p. 72 of reprint—(probably in part).

*Zaitha fusciventris*, Uhler, 1886, Checkl. Hem. Het. N. Amer. p. 28. (probably in part).

*Zaitha fusciventris*, Champion, 1901, Biol. Centr. Amer., Hem. Het., 2 : 365. (probably in part).

*Belostoma fusciventris*, Snow, 1906, Trans. Kansas Acad. Sci., 20 : 180.

*Belostoma fusciventris*, Kirkaldy and Bueno, 1909, Proc. Ent. Soc. Wash., 10 : 191. (probably in part).

*Zaitha fusciventris*, Banks, 1910, Cat. Nearc. Hem. Het., p. 9. (probably in part).

*Belostoma bakeri*, Montandon, 1913, Bul. Soc. Sci. Bucharest, 22 : 123-125.

*Belostoma fusciventris*, Van Duzee, 1916, Checkl. Hem. N. Amer., p. 53. (probably in part).

*Belostoma bakeri*, Van Duzee, 1917, Univ. Calif. Pub. Ent., 2 : 468.

*Belostoma fusciventris*, Van Duzee, 1917, Univ. Calif. Pub. Ent., 2 : 468-469. (probably in part).

*Belostoma apache*, Van Duzee, 1917, Univ. Calif. Pub. Ent.,

1964 : 469. (in part Calif. record of var. *tubatum*). *Belostoma* 46

*Belostoma fusciventre*, DeCarlo, 1938, An. Mus. Arg. Cien. Nat., 39 : 222-223. (probably in part).

*Belostoma bakeri*, DeCarlo, 1938, An. Mus. Arg. Cien. Nat., 39 : 229-230.

*Belostoma fusciventris*, Essig, 1938, Insects West. N. Amer., p. 367. (probably in part).

*Belostoma bakeri*, Usinger, 1956, Aquatic Insects Calif., p. 206.

*Belostoma flumineum*, Usinger, 1956, Aquatic Insects Calif., fig. 7 : 16a.

*Belostoma bakeri*, Menke, 1958, Bull. So. Calif. Acad. Sci., 57: 166-167, figs. 4, 7, 10.

*Belostoma bakeri*, Roback, 1958, Trans. Amer. Ent. Soc., 84 : 8.

*Belostoma bakeri*, Lauck, 1959, Bull. Chicago Acad. Sci., 11: 9.

Other species referred to as *bakeri*.

*Belostoma bakeri*, Ellis, 1952, Amer. Mid. Nat., 48: 328. (= *B. fiumineum*)

*Belostoma bakeri*, Penn, 1952, Louisiana Acad. Sci., 15: 51. (= *B. fiumineum*)

*Size and shape.* Body ovoid. Length :  $d$ , 15.5-21.0 mm. ;  $9c$ , 16.5-21.5 mm. Width : , 7.3-9.5 mm. ;  $9g$  7.5-10.0 mm. Width of head, 3.8-4.4 mm. ; width of pronotum, 5.4-8.1 mm. ; length of pronotum, 2.5-3.4 mm.

*Color and markings.* Light brown suffused with yellow to dark mahogany-brown. Pronotum with faint, often obscure, irregular dark longitudinal stripes ; anterior portion of scutellum dark brown, caudal part lighter ; thoracic venter brown, often with yellow patches. Each femur with three, often faint and obscure, irregular dark bands ; protibia with three dark bands, mesotibia with three irregular dark bands, metatibiae dark or with indistinct markings ; tarsi dark. Abdominal venter usually dark brown to mahogany ; connexival margin brown.

*Structural characteristics.* Interocular space 1.6 to 1.8 times the width of an eye ; anteoculus about three-fourths the interoculus ; clypeus extending beyond the ocular line ; beak relatively short and stout. Abdominal pilosity completely covering connexivum, bordering about three-fourths the length of the genital operculum. Genitalia as shown in figures 102 and 108. Air strap as shown in figure 111.

*Comparative notes.* *B. bakeri* is the only species of this group that has the clypeus extending beyond the ocular line.

*Special variations.* *B. bakeri* varies considerably, especially in regard to size and shape. Specimens from Oregon and Washington are generally larger than those from California and Arizona. A series of specimens from Yavapai Co., Arizona (MC), are quite small with rather narrow pronota. The lateral margins of the pronotum are usually straight but distinctly concave in a few.

*Nomenclature.* Several specimens had been misidentified as *B. minor*, *B. apache*, and *B. fusciventria* by several of the earlier workers on aquatic Hemiptera.

*Types.* A lectotype labelled, "Amerika bor., *Belostoma bakeri*, cotype Montandon 1913" from the Berlin Entomological Institute is proposed. The specimen is a female 18.5 mm. long and 8.8 mm. wide. A second specimen labelled "Hermoeta Rivers, *Belostoma bakeri*, Montandon 1913" was also present but was not included in the original description nor was the specimen designated as a co-type.

*Distribution.* *B. bakeri* ranges along the Pacific states as far north as Washington, but is primarily a species of the Sonoran desert regions and extends eastward to Texas. Specimens from the following localities have been identified :

#### UNITED STATES.

ARIZONA : *Cochise Co.*, y (AMNH), 5 o e, 4 9 9 (KU) ;

Douglas, 3 d o (KU), d', 2 (FU) ; St. David, o (DC) ;  
San Bernardino Ranch, 2 (KU) ; *Maricopa Co.*, Phoenix, (CNHM), o (USNM) ; *Pima Co.*, Lowell Ranger Sta., 4 9 (AMNH) ; *Yavapai Co.*, Montezuma Well Nat. Mon., 9 e d, 4 (MC).

CALIFORNIA : 4 o e, 3 (USNM) ; S. Cal., d, y (USNM) ; *Alameda Co.*, Oakland, d' (CNHM), cr, y (KU), 3 e e (BC) ; Piedmont, d' (KU) ; *Imperial Co.*, Brawley, a (CU) ; *Inyo Co.*, y (MC), y (MU) ; Laws, 3 e e (MU) ; Lone Pine, 4 e 4 (KU) ; Warm Sulphur Springs, 2 d' (MC) ; *Los Angeles Co.*, y (CNHM), e (CU), 2 (USNM) ; Claremont, '9 (USNM), 2 e d' (MC) ; Los Angeles, 2 d' (USNM) ; *Marin Co.*, o (KU) ; *Modoc Co.*, Adin, d' (USNM) ; Surprise Valley, y (MU) ; *Mono Co.*, Benton, y (MU) ; Blind Springs, e, 5 (MU) ; Hot Creek, 2 y y

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Lauck : Monograph of the Genus *Belostoma* 48  
 (MU) ; Long Valley, 9 (FU), 2 a c, 2 9 9 (MU) ; Orange Co., Laguna, 2 9 9 (KU) ; Laguna Beach, cr, 2 9 9 (CU), 2 di d, 5 ? 9 (KU), 9 (MU), 9 (PC) ; Santa Ana,  $\beta'$  (INNS) ; Placer Co., Lake Tahoe, d', 2 9 9 (KU) ; Riverside Co., 2 9 9 (KU) ; San Diego Co., Campo, e (KU) ; Miramar, 4

d, 2 9 9 (KU) ; San Diego, 9 (CNHM), 2 9 9 (USNM) ; Warner Springs, d (AMNH), d' (KU) ; San Francisco Co., San Francisco, 9 (USNM) ; Santa Barbara Co., Santa Barbara, (AMNH), e (USNM) ; Santa Clara Co., Milpitas, e, 9 (CNHM), cr (KU) ; Palo Alto, di (CU) ; Santa Clara, 9 (PC) ; Sonoma Co., e (AMNH), 9 (USNM) ; Santa Rosa, e (BC).

NEVADA : d, 9 (KU), a (USNM) ; Churchill Co., Fallon, e (KU) ; Elko Co., Goshute Valley, d', 9 (FU), 9

$\beta'$  2 9 9 (MU) ; Eureka Co., Diamond Valley,  $\phi$  3 9 9 (MU) ; Humboldt Co., Cane Spring, 3 di, 3 9 (MU) ; Squaw Valley, a (MU) ; Thousand Creek, 9 (FU), 4 a, ? (MU) ; Nye Co., Duckwater Creek, 9 (MU) ; Monito Valley, e, 9 (MU) ; Railroad Valley, 2 d d, 3 9 9 (MU) ; Riorden, 2 d' d, 3 9 9 (MU) ; White River Valley, d 9 (MU) ; Pershing Co., e (MU) ; Washoe Co., Reno, 2 d', 9 (KU) ; White Pine Co., Preston, 9 (MU).

NEW MEXICO: Eddy Co., 3 e e, 5 9 9 (KU) ; Hidalgo Co., Lordsburg, e, 2 9 9 (DU).

OREGON: Lake P. O., di (USNM) ; Lake Co., Warner Mts., 2 e d, 9 (MU) ; Umatilla Co., Umatilla, a, 9 (KU).

TEXAS : 2 d e (INHS), (SM), (USNM) ; Davis Mts., 9 (KU) ; Bexar Co., Helotes Creek, d' (CU) ; Brewster Co., Alpine, d' (USNM) ; Cameron Co., 9 (KU) ; Hays Co., Dripping Springs, 9 (MC) ; Hidalgo Co., Progreso, 9 (KU) ; Jeff Davis Co., 9 (MU) ; Kerr Co., Kerrville, 9 Victoria Co., Victoria, (USNM).

UTAH : 9 (KU) ; Cache Co., Logan, a (KU) ; Milliard Co., El Grandy, 3 9 9 (MU) ; Salt Lake Co., Salt Lake City, 2 9 9 (INHS) ; Utah Co., Spanish Fork, d, 9 (KU).

WASHINGTON: Walla Walla Co., Wallula, d' (MC).

MEXICO.

BAJA CALIFORNIA : Tijuana, 2 a a (MC).

DURANGO : Durango, di, 9 (MC).

Additional reliable records of *B. bakeri* may be found in Menke (1958) .

***Belostoma saratogae* Menke**

Figures 103, 109, 112

*Belostoma saratogae* Menke, 1958, Bull. So. Calif. Acad. Sci., 57: 169-173, figs. 2, 3, 7.

*Belostoma saratogae*, Lauck, 1959, Bull. Chicago Acad. Sci., 11 (1) : 9.

*Size and shape.* Body elliptical. Only a male and female paratype, supplied by Dr. Menke, have been examined. Menke gives the following dimensions : "Length varies from 17.5 to 19.0 mm. ; width varies from 8 to 9 mm.

*Color and markings.* Dark brown to nearly black. Anterior portion of pronotum darker than caudal part ; scutellum brownish-black ; thoracic venter with a few light brown patches. Femora, tibiae, and tarsi dark, markings faint and indistinct except for three bands on profemur.

*Structural characteristics.* Interocular space 1.7 times the width of an eye ; anteoculus subequal to the interoculus ; interoculus short, slightly less than width of an eye ; beak relatively short and robust, segment I subequal or slightly shorter than II. Air strap as shown in figure 112. Genitalia as shown in figures 103 and 109.

*Comparative notes.* Structurally this species is very similar to *B. bakeri*, but has a shorter and proportionally wider air strap. Usually specimens of *B. saratogae* are darker than those of *B. bakeri*.

*Types.* The allotype and holotype are with 14 additional paratypes in the Los Angeles County Museum. Thirty-seven paratypes are at the University of California at Los Angeles, and additional paratypes are at KU, CIS, and MC.

*Distribution.* This species is known only from Saratoga Springs, Death Valley, California. Menke studied a total of 41 ♂'s and 48 ♀'s from this locality.

***Belostoma lutarium* (Stål)**

Figures 104, 110

*Belostoma flumineum* Say, 1831, Descript. New Species N. Amer. Insects, 12-13. (in part) .

*Belostoma flumineum*, Say, 1832, New Species N. Amer. Insects, p. 32. (in part) .

*Zaitha lutaria* Stål, 1856, *Ofvers K. Vet.-Akad. Forhandl.*, 12: 190.  
*Zaitha lutaria*, Dufour, 1863, *Ann. Ent. Soc. France*, (4)3 : 400.  
*Zaitha aurantiaca*, Uhler, 1886, *Checkl. Hem. Het. N. Amer.*, p. 28.  
*Zaitha lutaria*, Mayr, 1871, *Verh. zool.-bot. Ges. Wien*, 21: 416.  
*Zaitha aurantiaca*, Walker, 1873, *Cat. Hem. Het. Brit. Mus.*, 8 : 179.  
*Belostoma aurantiacum*, Bueno and Brimley, 1907, *Ent. News*, 18: 435.  
*Belostoma aurantiacum*, Kirkaldy and Bueno, 1909, *Proc. Ent. Soc. Wash.*, 10: 190.  
*Belostoma lutarium*, Montandon, 1909, *Bul. Soc. Rom. Sci. Bucarest*, 18 : 187-188.  
*Zaitha lutarium*, Banks, 1910, *Cat. Nearct. Hem. Het.*, p. 9.  
*Belostoma aurantiacum*, Smith, 1910, *Ann. Rept. N. J. State Mus.*, p. 168.  
*Belostoma lutarium*, Bueno, 1912, *Can. Ent.*, 44 : 213.  
*Belostoma aurantiacum*, Barber, 1914, *Bull. Amer. Mus. Nat. Hist.*, 33: 498.  
*Belostoma flumineum*, Barber, 1914, *Bull. Amer. Mus. Nat. Hist.*, 33 : 498. ( questionable).  
*Belostoma lutaria*, Van Duzee, 1916, *Checkl. Hem. Amer.*, p. 52.  
*Belostoma lutarium*, Van Duzee, 1917, *Univ. Calif. Publ. Ent.*, 2 : 468.  
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*Belostoma lutarium*, DeCarlo, 1938, *An. Mus. Arg. Cien. Nat.*, 39 : 233-234.

*Belostoma lutarium*, Brimley, 1938, Insects N. Carolina, p. 84.

*Belostoma lutarium*, Britton, 1938, Conn. State Geol. Nat. Hist. Surv. Bull., 60: 31.

*Belostoma lutarium*, Millspaugh, 1939, Field Lab., 7: 81-82.

*Belostoma lutarium*, Penn and Ellis, 1949, Fla. Ent., 32: 159.

*Belostoma lutarium* Herring, 1951, Fla. Ent., 34: 20-21.

*Belostoma lutarium*, Ellis, 1952, Amer. Mid. Nat., 48: 327-328.

*Belostoma lutarium*, Penn, 1952, Proc. Louisiana Acad. Sci., 15: 51-52.

*Belostoma lutarium*, Roback, 1958, Trans. Amer. Ent. Soc., 84: 8.

*Belostoma lutarium*, Menke, 1958, Bull. So. Calif. Acad. Sci., 57: 163-164.

*Belostoma lutarium*, Wilson, 1958, Tulane Studies Zool., 6: 152.

*Belostoma lutarium*, Lauck, 1959, Bull. Chicago Acad. Sci., 11 (1): 9.

*Belostoma lutarium*, Froeschner, 1962, Amer. Mid. Nat., 67 (1): 232.

*Belostoma lutarium*, Schaefer and Drew, 1964, Southw. Nat., 9(2): 100.

*Size and shape.* Body broadly ovate. Length : ♂, 18.527.5 mm. ; ♀♀, 19.5-26.0 mm. Width : ♂♂, 9.4-13.5 mm. ; ♀♀, 10.3-13.0 mm. Width of head, 4.3-5.4 mm. ; width of pronotum, 6.3-9.0 mm. ; length of pronotum, 3.1-4.1 mm.

*Color and markings.* Brown, suffused with yellow. Thoracic venter light brown, spotted with black or dark brown. Profemur with three distinct dark spots, each meso- and meta-femur with three irregular dark bands ; protibia with regular dark bands, each meso- and metatibia with three irregular bands ; pro- and mesotarsi with dark apical tips, metatarsi dark. Abdominal venter brown to reddish-brown with darker patches ; connexival margin yellowish-brown.

*Structural characteristics.* Interocular space 1.7 to 1.9 times the width of an eye ; anteoculus slightly longer than interoculus ; beak long and slender, segment I about one-and-a-fourth longer than II. Pilosity not quite covering entire connexivum, with only a narrow mesal strip and small area at segmental sutures bare, extending slightly beyond penultimate segment but remote from genital operculum. Genitalia as

shown in figures 104 and 110.

*Comparative notes.* *B. lutarium* differs from the other members of this group by the pilosity of the connexivum which does not quite cover the entire connexivum.

*Types.* Holotype, 9, in the Stockholm Museum, without locality label. The holotype measures : length, 24.0 mm.; width, 11.1 mm.

*Special variations.* Specimens from southeastern United States and westward to Louisiana and northward along the coast to New Jersey are distinctly smaller than the northern and more western populations. The anteoculus is generally longer and the depth of the head is less in the southeastern populations. Similarly the lateral expansions of the ventral diverticulum are different. Specimens from Louisiana and New Jersey northward seem to be somewhat intermediate. It is believed that the species forms a cline rather than distinct subspecies. Additional specimens from the east-central states will help clarify these variations.

*Distribution.* *B. lutarium* is primarily a species of southeastern United States, but has been found as far north as Michigan in the midwest and is relatively common along the states of the Atlantic Ocean. Specimens from the following localities have been identified :

ALABAMA: *Houston Co.*, Chattahoochee State Park, cp, 9 (FU); *Lauderdale Co.*, Florence, se, 9 (KU).

ARKANSAS: *Washington Co.*, Fayetteville, d, 4 9 9 (KU). CONNECTICUT: *Tolland Co.*, Storrs, a, 9 (KU), 3 e a, 2 9 9 (UC); *New London Co.*, Baltic, 9 (UC); *East Lyme*, d (UC).

FLORIDA: a (CNHM), a (INNS), di (KU), 9 (UC), 2 9 9 (USNM); Atlantic Ocean, 29°69' N. 80°05' W. (about 25 miles from coast); *Alachua Co.*, 2 9 9 (MU); *Gainesville*, 29 a a, 22 9 9 (FU), e (KU), 6 9 9 (MU); *Kanapaha Sink*, e, 9 (FU); *Prairie Creek*, d' (FU); *River Styx*, e, 3 9 9 (FU); *Santa Fe River*, d" (FU); *Sugarfoot Hammock*, 9 (FU) *Brevard Co.*, *Titusville*, 2 9 9 (AMNH); *Citrus Co.*, e, 9 (USNM); *Inverness*, 9 (KU); *Dade Co.*, *Biscayne Bay*, 2 d' a, 9 (AMNH); *Everglades*, 9 (KU); *Miami*, e (DC), 2 .6 a, 9 (MU); *Hendry Co.*, *LaBelle*, 9 (KU); *Hernando Co.*, *Brooksville*, 9 (MC); *Highlands Co.*, *Lake Placid*,

5 d , 3 9 (CU), 2 9 9 (DC), 2 e e, 3 9 9 (KU) ; *Hillsborough Co.*, 7 9 9 (MU) ; *Jackson Co.*, Sneads, 9 (MU) ; *Taylor Pond*, 3', 2 9 9 (FU) ; *Lake Co.*, Leesburg, e (KU) ; *Lee Co.*, Ft. Meyers, 2 e a (USNM) ; *Orange Co.*, e (KU) ; *Rock Springs*, a 2 9 9 (KU) ; *Palm Beach Co.*, South Bay, e (KU) ; *Pinellas Co.*, (KU) ; *Gulfport*, 3' (MC) ; *Sarasota Co.*, Englewood 9 (CU), 9 (UC) ; *Fruitville*, d (KU), Venice, e (CU) ; *St. Johns Co.*, St. Augustine, e (CNHM) ; *St. Lucie Co.*, Ft. Pierce, e (KU) ; *Suwannee Co.*, Ichetucknee Springs, 9 (FU).  
**GEORGIA** : *Charlton Co.*, Okefenokee Swamp, 9 c3' 5 9  
(KU) ; *Decatur Co.*, Bainbridge, 9 (USNM) ; *Woodruff Dam*, 9 (MU) ; *Lee Co.*, Leesburg, 9 (MU) ; *Seminole Co.*, Ray's Lake, d 2 9 9 (FU) ; *Toombe Co.*, Inman Creek, e (MU).

**ILLINOIS** : *Adams Co.*, Quincy, (INHS) ; *Alexander Co.*, Olive Grove, (L) ; *Clinton Co.*, Trenton, (L) ; *Crawford Co.*, West York, (L) ; *Edwards Co.*, Albion, (L) ; *Jackson Co.*, Howardtown, (L) ; *Jefferson Co.*, Mt. Vernon, (L) ; *Madison Co.*, Midway, (L) ; *Marion Co.*, Salem, (L) ; *Pope Co.*, Golconda, (L) ; *Richmond Co.*, Olney, (L) ; *Union Co.*, Wolf Lake; *White Co.*, Carmi, (L) ; *Williamson Co.*, Marion, (L).

**INDIANA** : *Posey Co.*, Poseyville, (CNHM).

**KANSAS** : *Cherokee Co.*, e (DC), 22 d e, 20 9' (KU). **LOUISIANA** : a (USNM) ; *Caddo Par.*, Shreveport, d (MSU) ; *Jefferson Davis Par.*, 9 (MU) ; *Orleans Par.*, New Orleans, 9 (UC), c? (USNM) ; *Richsand*, d (USNM) ; *Winn Par.*, Winnfield, e (MU).

**MARYLAND** : *Anne Arundel Co.*, Annapolis, e (KU).

**MASSACHUSETTS** : 9 (AMNH), 9 (USNM).

**MICHIGAN** : *Washtenaw Co.*, Half-Moon Lake, 9 (MU).

**MISSISSIPPI** : *Harrison Co.*, 8 e 6 9 9 (CU) ; *Biloxi*, 6 , 7 9 9 (UC) ; *Hinds Co.*, Clinton, d, 9 (DC), 9 (CU) ; *Washington Co.*, a (DC).

**MISSOURI** : 9 (CNHM) ; *Butler Co.*, Black River, a (MU) ; *Cape Girardeau Co.*, La Crois Creek, Cape Girardeau, 9 (KU).

**NEW JERSEY** : 9 (AMNH), d (USNM).

**NORTH CAROLINA** : *Wake Co.*, Raleigh, 9 (AMNH), 3 9 9 (NC).

**OHIO** : *Athens Co.*, 9 (KU).

OKLAHOMA : *Carter Co.*, Ardmore, 2 d<sup>c</sup> e, 4 9 9 (KU) ; *Rogers Co.*, Claremore, d (MU).

SOUTH CAROLINA : 2 9 9 (USNM).

TENNESSEE : *Clay Co.*, Memorial, 9 (USNM) ; *Lake Co.*, 2 9 9 (L).

TEXAS : 2 d<sup>c</sup> a, 9 (MU) ; *Brazos Co.*, Bryon, 6 (MU) ; *Colorado Co.*, 2 d<sup>c</sup>, 2 9 9 (KU) ; *Dallas Co.*, Dallas, 9 (MU) ; *Harris Co.*, Houston, 9 (USNM) ; *Hays Co.*, San Marcos, d, 9 (MU) ; *Victoria Co.*, Victoria, d<sup>c</sup>, 9 (USNM).

VIRGINIA : *Norfolk Co.*, Dismal Swamp, 2 9 9 (KU).

#### ABBREVIATIONS OF COLLECTIONS CITED

AMNH—American Museum of Natural History, N. Y.

BA—Museum of Natural History at Buenos Aires, Argentina

BC—University of British Columbia, Vancouver, Canada

BM—Zoologische Staatssammlung, Munich, Germany

CC—Collection of Dr. C. S. Carbonell, Universidad de la  
República, Montevideo, Uruguay.

CIS—California Insect Survey, University of California,  
Berkeley

CNHM—Chicago Natural History Museum, Chicago, Illinois

CU—Cornell University, Ithaca, N. Y.

DC—Collection of Dr. Carl J. Drake (USNM)

FU—University of Florida, Gainesville

HNM—Hungarian National Museum, Budapest

INHS—Illinois Natural History Survey, Urbana

ISU—Iowa State College, Ames

KU—University of Kansas, Lawrence

L—Collection of Dr. David R. Lauck, Humboldt State College,  
Arcata, California

LACM—Los Angeles County Museum, California

MC—Collection of Dr. Arnold S. Menke, University of California,  
Davis

MS—Museum of Stockholm, Sweden

MSU—Michigan State University, Lansing

MU—University of Michigan, Ann Arbor

MV—Naturhistorisches Museum, Vienna, Austria

NC—North Carolina Department of Agriculture, Raleigh

PC—Pomona College, Pomona, California

UC—University of Connecticut, Storrs

USNM—United States National Museum, Washington, D. C.

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